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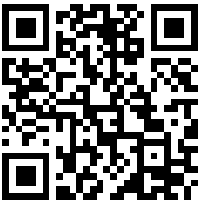

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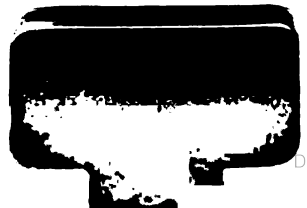

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THE RAILWAY MAGAZINE.]

**UP NON-STOP "FLYING SCOTSMAN," L.N.E.R.**

**4-6-2 Locomotive No. 4476, "Royal Lancer."**

**(From a Photograph by F. R. Hebron)**

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*Photo.*] [*R. Davison.*

GENERAL VIEW OF "BASE CAMP." RAILWAY IN FOREGROUND.

# A Highland Water Power Works Railway.

By ROBERT F. LEGGET, M.Eng. (Liverpool).

AMONG privately-owned railways there are many, some constituting relatively extensive systems, of which but little is known by the general public, a fact not very surprising since such lines are usually located in remote parts, while the works for which they are built are frequently of interest mainly to engineers. Contractors' railways, usually termed "temporary," on civil engineering works are of this class—lines without which the construction of practically all important works would be a matter of almost insuperable difficulty. In the building of roads, waterworks, railways, and the many other undertakings classed under the general term of public works, temporary railways play a major part in the transport of the great quantities of material generally necessary, being, as a rule, taken up and dismantled when the main works are complete.

There is at present in use in the north of Scotland one such railway, which has been constructed by Balfour, Beatty & Co. Ltd., the principal contractors for the Lochaber Water Power works of the British Aluminium Co. Ltd., and as it is one of the most extensive temporary railways ever put down in this country it is thought that a description will be of interest.

The Lochaber water power scheme is the third hydro-electric undertaking of the British Aluminium Company in Scotland, a plant being opened at Foyers in 1896, and a much larger one at Kinlochleven in 1909. The complete scheme will utilise a watershed of 303 square miles, water being collected from an area extending to the upper reaches of the Spey. The main reservoirs are to be Lochs Laggan and Treig, which will be connected by a tunnel, the water being then led from Loch Treig to a power house situated about a mile to the north of Fort William, through what is known as the main tunnel. All streams crossing this, with the previous tunnel, are to



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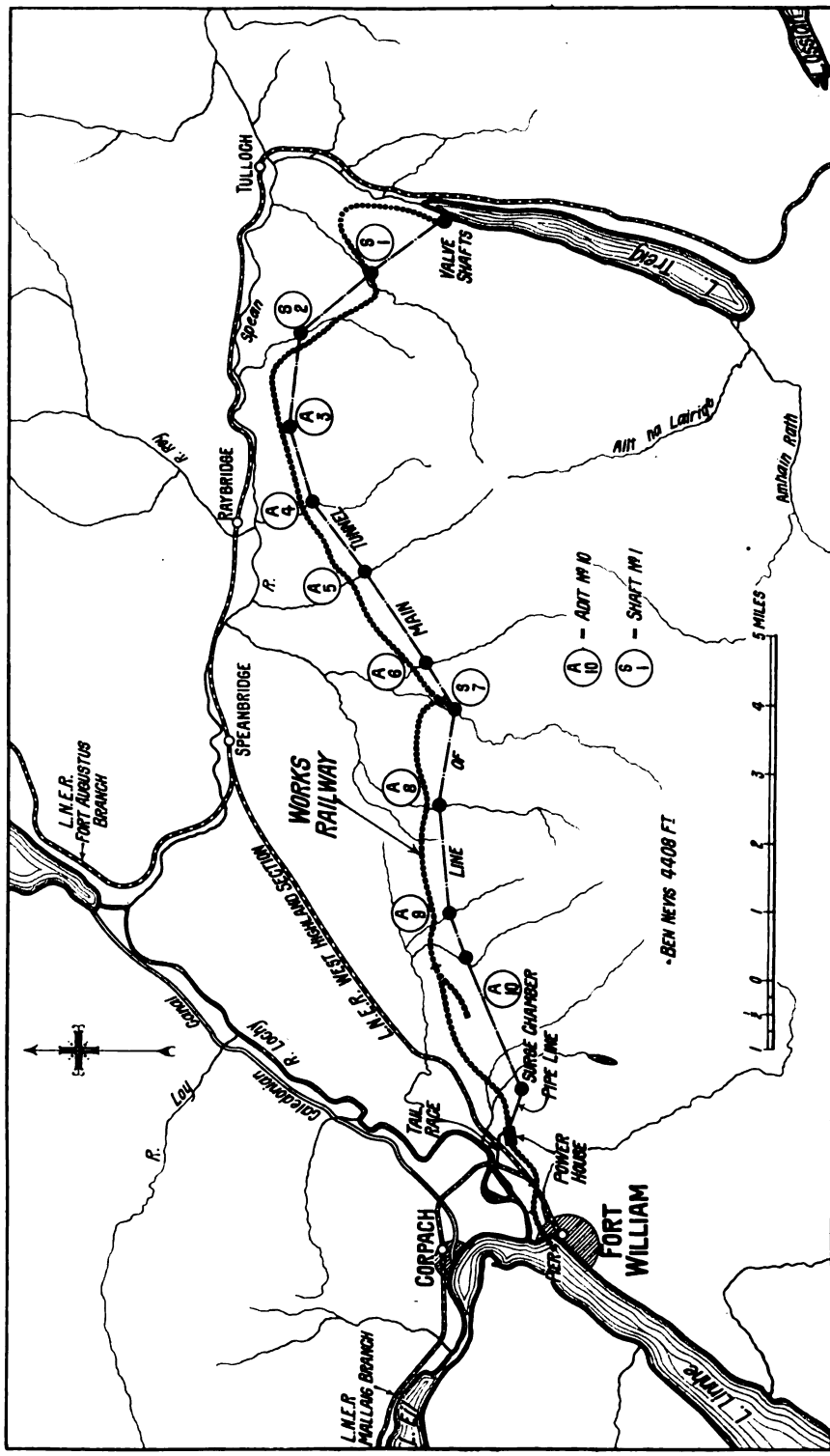


GENERAL MAP SHOWING LOCHABER WATER POWER WORKS RAILWAYS, &c.

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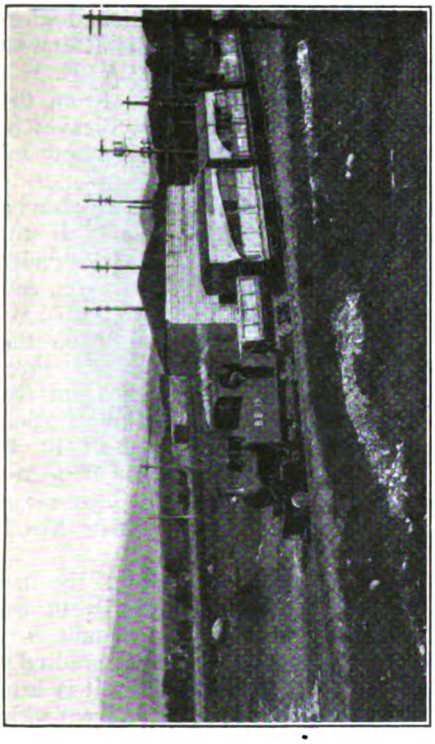
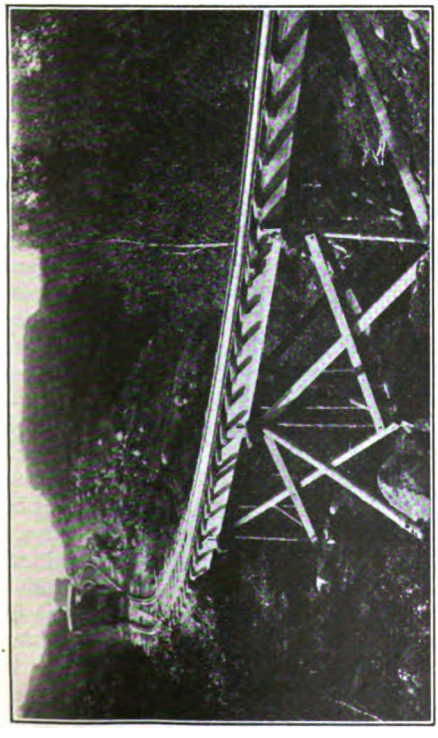


MORNING MAIL TRAIN AT BASE CAMP.

RESIDENT ENGINEER'S "SPEEDER" CAR.



TRESTLE BRIDGE AND "SPEEDER" CAR

DOWN MIDDAY TRAIN NEAR ADIT No. 9.

*Photos. R. Davison and W. D. McGudgeon.*



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be dammed, their water being diverted through shafts into the tunnels. A large aluminium factory will adjoin the power house. A new town is being built for the factory staff, and many new roads are being laid down in the vicinity.

All the works to the west of Loch Treig are now being constructed, the chief item being the main tunnel, 15 miles long and 15½ ft. in average diameter, thus being, it is believed, the largest water tunnel in the world. Its location can be seen from the accompanying map, the route having been designed to facilitate construction, which is being carried on from 23 faces, 14 from adits or small horizontal tunnels driven into the hillside, eight from vertical shafts which will afterwards be used as stream intakes, and one from the end of the tunnel at the head of the pipe line. At each adit and shaft there is a workman's camp—over 2,000 men being employed on this work alone—and as the tunnel is to be lined throughout with concrete, involving the use of thousands of tons of cement, the necessity for a construction railway can readily be understood.

The construction railway system can be said to start at the end of the reinforced concrete pier which has been built in Loch Linnhe, and which is to be connected to the factory by a 3-ft. gauge electric railway, the permanent way of which has been laid. After crossing the Mallaig branch of the L.N.E.R. by a timber bridge, the main road, and the West Highland line of the L.N.E.R. by an old road bridge, the line reaches the base camp, where are situated the main offices of the Resident Engineer and Contractors, workshops, stores, a locomotive shed, and an extensive hut encampment.

The "Lower End Works," comprising pipe line, power house and factory, tail race, and pier railway, are all in this locality, and are well served by an extensive railway system of both 2-ft. and 3-ft. gauges. The upper portion of the pipe line and the tunnel portal are served by an inclined cable-worked 3-ft. gauge railway, rather less than half a mile long, connected at the foot to the main system.

A siding from the West Highland line serves the base camp. Travellers on this line obtain a good view of this part of the work, and also of some of the tunnel adits and camps, as was mentioned when this line was described in the RAILWAY MAGAZINE by "F. S." and "A. E. H." in the January, 1927, issue. From the base camp the tunnel railway leaves in a north-easterly direction on its way up to the hills.

The general layout of the railway can be seen on the accompanying map. It will be observed that the tunnel passes under the northern shoulder of Ben Nevis, and the railway can be said to be situated for the greater part of its length on the northern slopes of the Ben Nevis range, which form the southern slopes of the valley of the River Spean. The elevation of the line, to the east of adit 10, is generally between 600 and 800 ft. above Ordnance Datum, the summit level being about 1,100 ft. O.D. between shafts Nos. 1 and 2.

After leaving the base camp, the line immediately starts the climb to the tunnel level, and this continues until adit 9 is reached. At the same time it gradually veers round to the east, and as it is here built on a steep hillside a magnificent view is obtained when the corner is rounded on the up (or downhill) journey. Loch Linnhe and Fort William to the left, Loch Eil and its encircling hills in the centre, and the River Lochy and Caledonian Canal looking but little more than silver ribbons on the right—such is the panorama that is slowly unfolded as one traverses this portion of the line.

Continuing the journey to the east, the railway runs across open moorland, flanked always by the steep slopes of the adjacent hills, one stretch of line skirting one of the many so-called "parallel roads" for which this and the adjoining valley of the Roy are famed. Many streams are crossed—some, indeed, being small rivers—and each of the adit or shaft camps are passed (the route having been chosen to achieve this object), with the exception of those at adit 10 and shafts 7 and 2. These three camps are all some distance off the main line, due to topographical details, but to each a spur siding is run—that to adit 10 being about one mile in length, while that to No. 7 camp runs for about half a mile up the delightful little valley of the Cour, a short spur to a concrete yard following the other bank for some distance from the main line. At the camp

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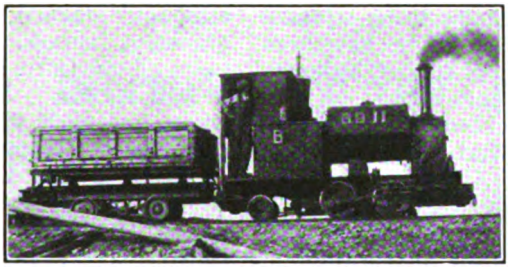

**1. 4-6-0T No. 15, WITH AN UP TRAIN OF STEEL TIP WAGONS, PASSING THE SPUR TO ADIT No. 10.** *Photo. John B. Devitt.*

**2. 0-4-2T No. 11, WITH WOODEN TIP WAGON.** *Photo. R. Davison.*

**3. HUNSLET 4-6-0T EX-ARMY LOCOMOTIVE, AND 45-H.P. CHAIN-DRIVEN SENTINEL LOCOMOTIVE AT THE BASE CAMP.** *Photo. John B. Devitt.*



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for adit 5, termed the central camp, several sidings, workshops and sheds are laid out, a similar depot being situated near the end of the line, at Fersit, adjacent to the valve shafts which lie close to the edge of Loch Treig. At this point the West Highland line is again quite close to the construction railway, but on the other side of the loch; no connection has, as yet, been made here between the two systems. The mileage from the end of the pier to the valve shaft terminus is 20 miles 600 yards.

The main tunnel line is 3 ft. gauge throughout, laid with F.B. rails of moderate section spiked to untreated wooden sleepers, resting on a gravel foundation. The ruling gradient is 1 in 30, and the minimum curvature 100 ft., figures indicative of the nature of the route traversed. The track is single throughout, passing loops being situated at all camps. Over 100 bridges have been constructed, generally of timber, although some of the longer ones consist of steel beams resting on a timber framework, while close to the central camp is the only steel truss bridge. Although termed a "temporary" railway, the line is eventually to be relaid to some extent and retained for the use of the British Aluminium Company in maintaining the works and to facilitate access to the various tunnel and intake controls.

The rolling-stock consists very largely of four-wheeled wooden wagons, generally of the tipping type, augmented by some eight-wheeled bogie wagons for special purposes, some being covered for the transport of food, &c. There are no special passenger vehicles, the larger ordinary trucks being adapted as occasion demands.

The locomotive stock is composed of Hunslet 4-6-0 outside cylinder side tanks, all of which bear appropriate names, *e.g.*, *Fersit Queen*, *Prince Charlie*, *Flora Macdonald* and *Highland Chieftain*; 40-H.P. and 25-H.P., Sentinel chain-driven 0-4-0 tanks; and 0-4-2 saddle tanks by Kerr, Stuarts and Co. Ltd., and Bagnall. The Sentinel locomotives, as will be seen from the illustrations, represent quite a departure from orthodox features of design, but they are remarkably efficient workers. They run very quietly, their exhaust consisting of very frequent short puffs, due to the chain gear, and as a result it is a surprising sight, at first, to come across one quite suddenly pulling a large load at a considerable speed on a steeply-graded section of the line, and yet unheralded by the usual belaboured panting of the normal type of machine.

For the use of the staff of the Resident Engineer and the Contractors special motor trolleys (dubbed "speeders") are provided. These are small four-wheeled trucks driven by petrol motors and seating two or three persons: there are also some Ford motor cars adapted to run on the 3-ft. gauge track with special flanged wheels.

It might be mentioned here that transport inside the tunnel is effected by means of 2-ft. gauge railways, operated by electric battery locomotives.

As is to be expected, the services, although efficient, are not fast, the gradients, curves, loads, and necessary halts all mitigating against any unusual overall speeds. Two trains cover the whole line each way per day, the time taken varying between four and five hours, according to the duration of the various stops that have to be made. Of the down trains, the early morning one takes a general works load, and the mid-day train the mails (always a considerable load), food, including about 20 hampers of bread, and general stores. Concrete material trains are worked, as required, by the Sentinel locomotives. In explanation of the overall running time, it should be noted that at the spurs it is usually necessary for the train locomotive to detach one or two vehicles, run them up to the camp where they are unloaded, and then return with them to pick up the main train—an operation which takes some time.

There are no signals on the line, all control being effected by means of the extensive telephone service in operation, instruments being available for railway use at all passing points, at the spur to adit 10, and at the base camp.

Such, in outline, are the details of this railway system, so remote, for the most part, from the normal haunts of man, but which, all the same, is performing good service to its present users and indirectly to the public.

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*Photo.*] L.M.S.R. (HIGHLAND SECTION) 0-4-4T No. 15052 AT LYBSTER. [*G. B. Grey.*

# "Farther North" By the L.M.S.R.

By J. F. GAIRNS, M.I.Loco.E., M.Inst.T.

AS one of the "favourite" lines, judging from the many photographs which are sent to the RAILWAY MAGAZINE, and the extent to which reference is made in letters, &c., the old Highland Railway has received a good deal of attention in these pages at one time or another, and quite a number of articles could be mentioned dealing with this interesting line. The Perth-Inverness section has, however, been considered most often, in conjunction with the main-line engines and principal train services, and not so much attention has been given to the "Farther North" section, beyond Inverness. It is, therefore, that section, by which the L.M.S.R. has the distinction of reaching the most northerly points in Great Britain accessible by rail, and which gives it the longest continuous rail route in the country under one ownership—Wick or Thurso to Euston or St. Pancras, to Bristol or, including the Somerset and Dorset Joint Railway, practically to Poole and Bournemouth—which will be considered in the present article.

There are no through coaches regularly operated from England to the section north of Inverness, though such vehicles occasionally work through, but from Glasgow through services are given on certain trains, and for some distance the traffic is by no means inconsiderable, including that between stations north and south of Inverness, while close connections are made at Inverness between Highland section principal trains working north and south thereof.

Although for many years prior to grouping the old complicated ownership of the Inverness-Wick and Thurso line had disappeared, it is interesting to review the building up of the system. In 1863 the Ross-shire Railway was opened from Inverness to Invergordon (with the Black Isle branch), reaching Bonar Bridge in 1864. The Sutherland Railway extended the route to Golspie, reached in 1868, while the Duke of Sutherland's Railway continued it to Helmsdale as from June, 1871. The Sutherland and Caithness Railway completed the route to Georgemas Junction and thence to Wick and Thurso in July, 1874. The Dingwall and Skye Railway, from Dingwall to Strome



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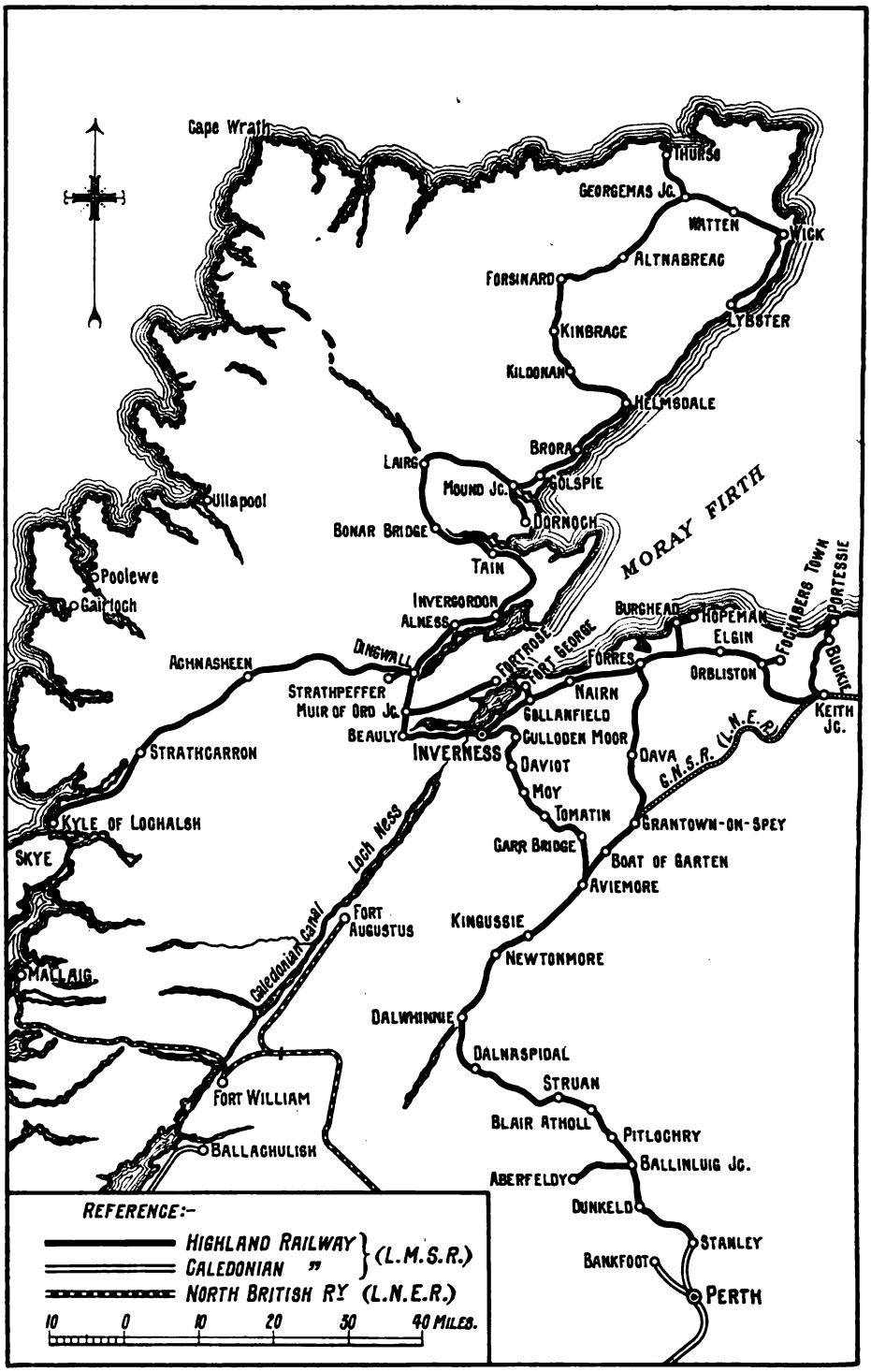


SKETCH MAP OF HIGHLAND SECTION, L.M.S.R.

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Ferry, was opened in 1870. All these were incorporated in the Highland system in 1884, that company adding the Dornoch Light Railway, the Wick and Lybster Light Railway, and the Strome Ferry-Kyle of Lochalsh extension.

The route taken north of Inverness is far from direct, as will be seen from the map reproduced on page 8, repeated from Mr. G. E. Lane's article published a year ago, though on that occasion the Highland section was considered on a general basis with only incidental references to "Farther North" rail facilities. The indirectness of the route is, however, a matter of necessity, in that as far as Helmsdale the interposition of several firths rendered any other course impracticable if coastal towns—the only ones with any substantial population—were to be served and the difficulties of crossing mountainous country avoided. North of Helmsdale the situation is somewhat different, though to Thurso, if not to Wick, the route is not unduly devious.

From Inverness trains proceed directly west, following Beauly Firth as far as Beauly, then turning north to Dingwall, the Black Isle branch from Muir of Ord to Fortrose serving the peninsula otherwise avoided. Cromarty Firth is then followed to beyond Invergordon, the line then striking across to the south side of Dornoch Firth to Tain. From this point, although not a great distance "as the crow flies" from Dornoch, on the other side of the Firth, the railway makes a tremendous detour *via* Bonar Bridge and Lairg to The Mound (junction for the Dornoch Light Railway), so that the rail distance from Tain to Dornoch becomes a matter of forty miles or so. No other route would, however, have been practicable or desirable unless the tremendous cost of crossing the Firth direct had been accepted, while the present route has its value in other respects.

From Golspie to Helmsdale the sea coast is followed, after which wide stretches of moorland are crossed to Georgemas Junction, where the Thurso and Wick lines separate.

Speaking generally, it cannot be said that the "Farther North" section is specially attractive from the scenic point of view, in which respect it ranks appreciably below the Perth-Inverness section, direct or *via* Forres. It has, however, many pretty stretches, and many features of interest, as will be seen from the following notes, made during a recent trip separated by more than 20 years from the only previous journey made by the writer over the section.

Inverness is a peculiarly laid-out station, with south and north platforms approached from the same circulating area, but spreading out so as to form two sides of a "curved triangle," of which the third side is provided by a through connection from south to north. The usual arrangement, therefore, for trains which have to interchange passengers, parcels, mails, &c., is that a train from the south takes the avoiding line and then backs into a north platform, while one from the north runs past the station and backs into a south platform. This procedure had been adopted in the case of the 6.25 a.m. mail train from Perth, by which the writer had travelled, and within a few minutes of booked arrival time we were landed at one of the north platforms, with the basic make-up of the 10.10 a.m. Wick train adjacent on one side and the 10.20 a.m. "Skye" train on the other.

Passengers proceeding onwards had about 25 min. to change trains, and meanwhile the station staff was busy transferring mails and luggage as necessary, and when our engines—4-6-0 No. 14677 *Dunrobin Castle*, and 4-4-0 No. 14398 *Ben Alder*—had backed on with the completing vehicles, our train consisted of a Post Office van, a luggage van, a restaurant car, a first-class coach for Helmsdale, two vehicles for Wick, two for Thurso, and one for Strathpeffer to be detached at Dingwall. These were all bogie vehicles, corridor and vestibuled from the restaurant car to the rear Thurso coach, and represented a very comfortable and creditable set of vehicles in which to make a long and inevitably somewhat tiring journey to one to whom the route would be more or less familiar. Fortunately, no such consideration applied to the writer, while weather conditions were favourable to an appreciation of the beauties of sea and firth, moor and mountain, field and forest.

Leaving Inverness to time, a single-line brick viaduct leads to a bridge over the

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1. AFTERNOON SOUTH EXPRESS AT INVERNESS. SOUTH MAIN PLATFORM.
2. SKYE LINE EXPRESS AT INVERNESS, NORTH PLATFORM.
3. INVERNESS STATION AND STATION HOTEL.

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River Ness, of whose estuary a pretty view is had looking seawards. A further stretch of single line leads across to Clachnaharry swing bridge immediately in front of the second lock which governs the sea connection of the Caledonian Canal. The swing bridge is crossed slowly, and beyond it is the derelict platform of Clachnaharry station, now closed. Double track now commences and, generally following the shores of Beauly Firth, we pass Bunchrew and Lentran at about 50 m.p.h., maintaining about the same speed past Clunes, where single line recommences, by virtue of the tablet-exchanging apparatus fitted to all Highland section engines. Crossing the River Beauly by a steel viaduct, we curve into Beauly station, our first stop, in 16 min. from Inverness (9¾ miles). We are booked next to call at Dingwall, so we pass Muir of Ord Junction at speed, the following Skye line train providing the connection to the Black Isle branch to Fortrose. Muir of Ord station has a side platform for the down line and an island on the up side, crossed by a road bridge, the branch curving away to the east just outside station limits. By this time, hills are in view to the left, looking toward Strathglass, and the scenery is generally attractive. Passing Conon at speed, Dingwall is reached in 18 min. from Beauly (8¾ miles).

The station has a neat set of buildings on the down side, with refreshment rooms, &c. At the far end of the down platform is a bay for the Strathpeffer branch train. On this occasion, it included an L. & Y. coach and was worked by 4-4-0 No. 14394, *Loch Ashie*. As we left, it was ready to pick up the Strathpeffer through coach we had brought from Inverness. The up platform is an island and there are several sidings, Dingwall being a fairly busy place and a traffic centre. It is the junction for the Skye line, which is used by the Strathpeffer locals for two or three miles.

The shores of Cromarty Firth are then followed, and pretty views are had here and there, especially when a steep climb (there are many on the "Farther North" section) enables one to look down upon coast and water. Here, as at one or two other places, wonderful reflection effects are to be seen on the quiet waters of the Firth. Foulis is passed at speed, after which calls are made at Novar and Alness. On this section it is, we believe, possible to see a Black Isle train across the Firth, if times are suitable, though this was not our good fortune on this occasion. Near Alness the River Glass is crossed by a viaduct.

Invergordon has for some years been an important naval base, of which abundant evidence was afforded by the numerous warships and other vessels anchored in the Firth, the naval uniforms to be seen and the comparative "busy"-ness of the station. The sidings are fairly extensive, the town is of fair size, there are dockyard connections, and beyond the station, where the crossing loop is longer than usual, oil tanks indicate practical usefulness at the expense of spoiling scenic beauty for a mile or so.

Passing Delny (non-crossing, one platform) a stop is made at Kildary, after which we leave Cromarty Firth and strike across, through Nigg, to Fearn and thence to Tain, a fairly important town at which some trains from Inverness terminate. Leaving the station, a view is had across Dornoch Firth, the shores of which are followed for the next 16 miles, rendering this an attractive and scenic stretch of line, with wonderful views here and there up and down the Firth. After calling at Edderton, a run of 8¼ miles brings us to Bonar Bridge, where the station is located right on the water side, the town proper being across the water, now of moderate width only, and reached by means of a road viaduct.

Before the days of restaurant cars, Bonar Bridge was the principal place whereat passengers could obtain refreshments, and the writer can recall interesting scenes, in that somewhat unusual methods were in force. The special commodities in principal favour were soup and hard-boiled eggs. For trains calling around midday, plates of soup were prepared in readiness, but without spoons, and the cry was "A Sixpenny Spoon, Please," thus allowing passengers to help themselves while at the same time ensuring payment. For the afternoon trains the hard-boiled eggs (with tea, &c.) were favoured, though no particular call comes to our recollection. Now the glory of Bonar Bridge in this connection has departed, and its refreshment rooms meet only ordinary requirements, though it is still one of the most

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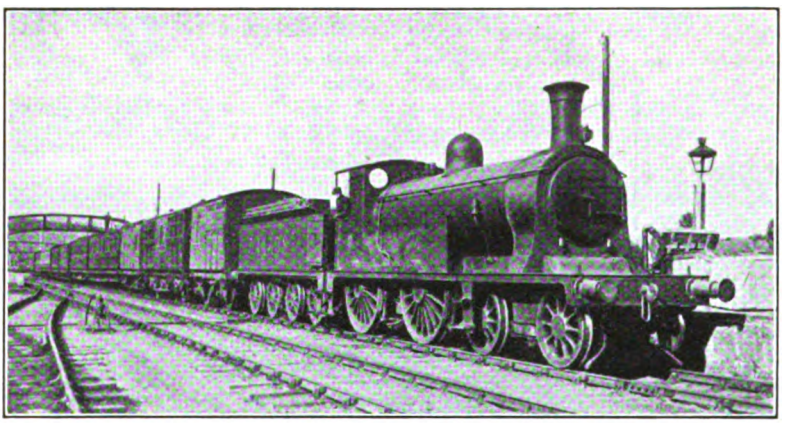

1. 3.20 P.M. TRAIN AT THURSO. *Photo. G. A. Pearson.*
2. TAIN-INVERNESS TRAIN AT DINGWALL. 4-4-0 No. 14398, "BEN ALDER." *Photo. R. D. Stephen.*
3. INVERNESS (LEFT) AND THURSO TRAINS AT GEORGEMAS JUNCTION. *Photo. J. F. Gairns.*

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important intermediate stations on the "Farther North" section.

Leaving Bonar Bridge, the 3 miles to Culrain are alongside the Kyle of Sutherland, as Dornoch Firth has now become. Here we noted an advertising board announcing a "Castle for Sale," at the same time making acquaintance with the shortest station-to-station run on the Highland section, and to which used to apply the only penny fare (pre-war) ever in force on the old Highland Railway. This is explained by the fact that Culrain is on one side of the River Shin and Invershin on the other side. The river is crossed between stations by a lattice girder bridge. The trains, even although relatively infrequent, are in considerable request for passing from one side to the other. Both stations have very short platforms, and provide two or three minute station-to-station times. The view crossing the river is quite pretty, and beyond the station the valley of the Shin provides some beautiful scenery.

By this time, wild and bleak country has been reached, and the agricultural characteristics of the first 40 miles or so of the journey are temporarily left behind, giving place to moorland and heath, rocky cuttings, snow fences, &c., except for occasional wooded patches where the line passes close to rivers, as it does for part of the way. Sometimes, too, the line climbs high up the hillside, only to descend to the valley again. At Lairg, an occasional terminus, a turntable is provided. As we leave the station a very fine view is had of the river as it comes down from Loch Shin. Our route, however, turns eastward on a 10-mile run to Rogart, on which section is a summit board indicating 484 ft. above sea level. At Rogart two rushing streamlets pass under the station. Beyond is a gravel pit and siding.

Then, four miles beyond Rogart, we reach the junction station known as The Mound. The station is in the middle of the tablet section, the one platform having a second face curving away to the road and rail viaduct by which the Dornoch Light Railway crosses the water, on the embankment which gives the station its name, to reach the Dornoch Peninsula. It is a rather pretty station and the centre of a fair amount of traffic. Dornoch is a favourite tourist and golfing resort, in which connection the Highland Railway many years ago erected a modern hotel which has always been well patronised in the season. Incidentally, The Mound is a restaurant car terminal, in that the car which comes north on the 6.30 a.m. from Inverness is here detached at 9.53 a.m., to return at 11.31 a.m. on the 8.25 a.m. from Wick. The branch engine—usually a small 0-4-4 tank engine, No. 16118, still appropriately named *Dornoch*—is used for attaching or detaching without calling upon the train engine.

Three and a-half miles beyond The Mound is Golspie from which the sea can be seen. A little further on a high viaduct crosses a ravine and river, and glimpses are had of Dunrobin Castle before reaching the Duke of Sutherland's private station. This has neat and rather pretty buildings and trains call as required. Just beyond is a shed which accommodates the Duke's private saloon (still in L.N.W.R. colours), and at one time, also, the private engine—a 0-4-4 tank—which was owned and sometimes driven by a former Duke.

Continuing, passing alongside a loch, the line runs down to the sea, and thence, through Brora and Loth, to Helmsdale. This seaside run is very pretty in places, as the line winds round the bases of the hills, with the sea and beach close on the up side. Helmsdale is then reached, the farthest terminal for trains from Inverness except the two each way which go right through daily. An engine shed and goods shed are provided, also sidings, Helmsdale being a fair-sized town.

Here our pilot engine, one van and the restaurant car, were detached, *Dunrobin Castle* continuing alone, though with a reduced load. Clear of the station, and turning inland, the country becomes bare and relatively sparsely populated. Salscraggie is merely a platform at which trains call as required, normal clear semaphore signals for each direction mounted on one post being operated as required if a train is to be stopped to pick up passengers, detraining passengers informing the guard. Kildonan is an ordinary station, but Borrobel is a halt platform similar to Salscraggie. Then come Kinbrace, Forsinard, Altnabreac, Scotscalder and Halkirk, a stretch of no less than

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1. GOODS TRAIN NEAR BLAIR ATHOLL. 0-6-0, No. 4312. *Photo. O. S. Nock.*
2. GOODS TRAIN NEAR DALNASPIDAL. H.R. 4-6-0, No. 109. *Photo. C. J. L. Romanes*
3. UP SLEEPING CAR EXPRESS NEAR DAVA. 4-4-0, No. 14419, "BEN MHO-LACH." *Photo. O. S. Nock.*

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44 miles from Helmsdale, largely through bleak moorland country, rocky and bare, in many places protected by single or double snow fences and inclined snow deflecting screens. Frequently there is not a house in sight and trees are few, while peat heaps and peat-digging operations suggest an analogy with Ireland, but in bleaker and wilder surroundings. Gradients are often far from easy, as indicated by a 708 ft. summit board.

From Scotscalder the country tends to become more agricultural, and by the time Halkirk is reached it may be said that moorland is left behind, though bleak and bare spaces still occur between Georgemas Junction and Wick, trees being few and far between and then usually of stunted kinds, and conditions generally suited only to a hardy population.

Approaching Georgemas Junction the Thurso branch comes in on the down side. This station has a long down main platform, the rear part of which curves round for the branch, with a bay behind where the branch train can be placed if waiting in readiness for a connection without through coaches. The up platform is north of the junction, so that Thurso trains are already on the branch as they pass the rear end of the down platform.

On the occasion of the writer's visit, 4-4-0 No. 14405, *Ben Rinnes*, was working the branch and was waiting to back on to our rear coaches to take them to Thurso, *Dunrobin Castle* proceeding to Wick. As the Thurso branch was actually first visited, this may be briefly described at this stage. Approaching the one intermediate station—Hoy—a glimpse is had of the Thurso Water on the left, and a little beyond the station this is crossed, its course being generally followed for the rest of the way. The river occupies a somewhat picturesque valley into which we look, a peculiarity being that, as a rule, one bank is steep and rough and the other comparatively level and adjacent to grazing land, though not always the same side. Here and there the river is crossed by footbridges, one of suspension type, while broken water shows that the Thurso Water is not navigable thus far from its mouth. The surroundings are generally more or less picturesque.

Leaving the river, a stop is made at a small ticket platform located in a green cutting, and then the terminus is entered. This has the usual main platform, terminating under a roof which covers also an adjacent line, an unsheltered bay on the outer face of the main platform providing additional accommodation. Alongside the passenger station is the goods shed and there are fairly extensive sidings and engine shed. The station is a simple stone erection with usual offices, but only ordinary accommodation. The main road down to the town leads directly from the station, though it is some distance to the sea. Thurso ranks, however, as the most northerly station in the British Isles, a good deal more so than Wick, which is on the east coast, and Lybster, the ultimate rail limit, which is well south of Wick.

Later, the writer proceeded to Wick by the Thurso branch train, working locally from one place to the other as a through journey. From Georgemas the route follows open country for some miles, though a fair number of houses come into view, and there are stunted trees here and there. A fair-sized loch is passed on the right, and a river accompanies the railway for some distance. There is not, however, much of a distinctive character as we call at Bower and Watton stations. Tickets are collected at Bilbster. Wick station is very similar to Thurso in its layout. Alongside is the Wick Water, which has to be crossed by a bridge just above the harbour to reach the older portion of the town, though there are considerable extensions on the station side. The Lybster Light Railway leaves the main line a short distance from the station. It is a useful line, but not particularly distinctive scenically. It is usually worked by a small 0-4-4 tank No. 15050, appropriately named *Lybster*.

A few notes may now be given in regard to train services though these were briefly summarised a year ago. Normally, there are two through trains only for the whole length of the route, with one as far as Helmsdale, one to Lairg (in the height of the season only), and three to Tain, such of the Skye line trains as are not sections of main-line trains adding to the facilities of the Inverness-Dingwall section.

From Inverness the first train is the 6.30 a.m., which is really an extension of the 1.15 a.m. from Perth (10.35 p.m. from Buchanan

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1. THE MOUND JUNCTION. DORNOCH TRAIN RIGHT.
2. DINGWALL DOWN PLATFORM.
3. HELMSDALE, SHOWING SCENERY AHEAD.

*Photos. J. F. Gairns.*

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Street, Glasgow, the previous night, Sundays, 10.35 p.m. Glasgow Central). This usually includes through carriages from Glasgow to Wick and has a semi-sleeping car as far as Inverness. Arriving at the "Capital of the Highlands" at 5.45 a.m., the north train proceeds at 6.30 a.m. with the Glasgow-Wick and Inverness-Thurso carriages, and a restaurant car which proceeds as far as The Mound, returning thence on the 8.25 a.m. from Wick, as already mentioned.

The train also includes luggage vans and mail vans. It takes 6½ hours for the 161¼ miles to Wick, but this is by no means a bad time, seeing that it calls at all stations after Beauly, except that it omits Foulis and calls conditionally only at Dunrobin private station, Salzcraggie and Borrobol platforms, and at Bower station.

On Wednesdays and Fridays in summer, the next train is the 7.25 a.m. for the Skye line and Strathpeffer, and therefore leaving the main line at Dingwall. Otherwise, the next train is the 9.15 a.m., all stations from Inverness to Tain. This train connects with the 5.5 a.m. from Perth, which brings the sleeping cars from London (Euston and King's Cross) to Inverness and takes a certain amount of through traffic, though long-distance passengers generally prefer to have breakfast at the Station Hotel, Inverness, and go on by the 10.20 a.m., a necessity for those going beyond Tain.

Up to about the middle of August, a relief express is run from Inverness at 9.48 a.m. as far as Lairg, calling at the same stations as the 10.20 a.m., but, otherwise, the next train is the 10.20 a.m., the principal train of the day. This, as already indicated, awaits the arrival of the 6.25 a.m. mail train from Perth, due at 9.50 a.m., and conveys through luggage and postal vans, though the passenger vehicles (for Wick and Thurso) start from Inverness, a change being therefore necessary for through passengers. The restaurant car goes as far as Helmsdale, whence it returns attached to the 3.20 p.m. from Wick. This train omits Bunchrew, Lentran, Clunes, Muir of Ord, Conon, Foulis, Delny and Nigg stations, but otherwise calls everywhere to Helmsdale. It is not scheduled to call at Dunrobin private station, but often does so, as in the case of the writer's journey. At Loth the train calls unconditionally; it is not supposed to call at Salzcraggie or Borrobol platforms, and the Kildonan, Kinbrace and Bower stops are conditional. Altnabreac, Scotscalder and Bilbster stations are ignored altogether. Incidentally this timing means that in this direction Altnabreac and Scotscalder stations have one train only daily, as have also the "platforms."

Behind the 10.20 a.m. is the 10.30 a.m. through Skye line train, with restaurant car as far as Achnasheen. There is then a long interval, the next train being the 3.5 p.m. all stations to Helmsdale. Next (except on Fridays in the season) is the 5 p.m. to Tain, and the day's service is completed by the 8.10 p.m. to the same place.

Returning, the two through trains are, ordinarily, the 8.25 a.m. and the 3.20 p.m. from Wick, each with through carriages from Thurso as well as Wick to Inverness, the Wick vehicles in the former continuing on the 3.45 p.m. from Inverness to Perth and proceeding thence to Glasgow. The morning train obtains restaurant car facilities at The Mound and the afternoon train at Helmsdale. Both call at certain stations which, on the down journey, have one train only daily or have conditional calls only, while the morning train has a crowd of calls which are made as required on the Tain-Inverness section, Invergordon being the only intermediate station not having a conditional restriction. In the case of the writer's own journey, a good proportion of these stops were made. The afternoon train is practically all stations to Dingwall and conditional beyond. Other trains are the 8.5 a.m. from Dingwall, 6.10 a.m. from Helmsdale, 12.25 p.m. and 4.5 p.m. from Tain, and two Skye line trains from Dingwall due in Inverness at 2.50 and 9.20 p.m.

This service may appear to be somewhat inadequate. It is, however, built up in a manner which very clearly indicates adaptation to requirements and traffic characteristics. An important factor is the making of connections with southern section trains as already shown, and this fact, of course, frequently governs the times at which trains are run. Analysing the situation, we find that there are seven or eight trains between Inverness

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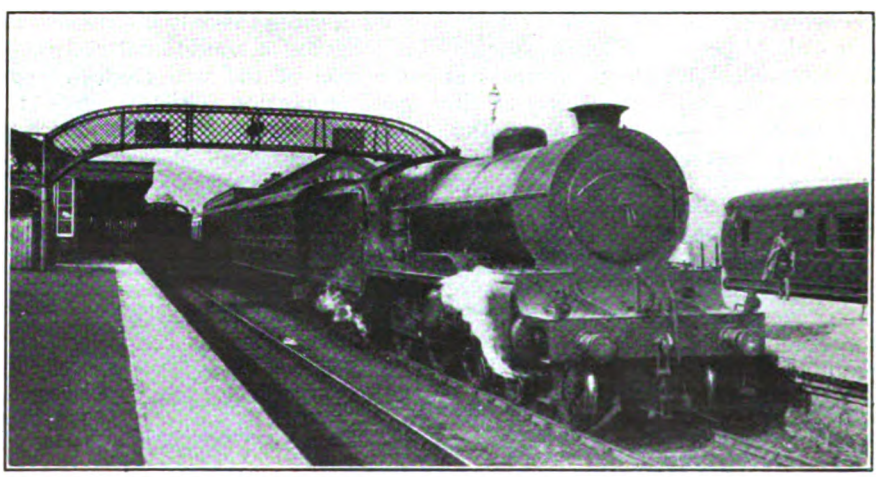

1. **HIGHLAND EXPRESS AT AVIEMORE. 4-6-0's Nos. 14682, "BEAUFORT CASTLE" AND No. 14755 "CLAN MACKINNON."** *Photo. J. J. Cunningham.*

2. **HIGHLAND EXPRESS NEAR PERTH. 4-6-0's Nos. 14688, "THURSO CASTLE," AND 14675, "TAYMOUTH CASTLE."** *Photo. P. Ransome Wallis.*

3. **HIGHLAND EXPRESS AT AVIEMORE. 4-6-0 No. 14756.** *Photo. W. H. C. Kelland.*

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and Dingwall, six as far as Tain, three onwards to Helmsdale and two beyond in each direction, approximately the relative requirements of the respective stages.

There is, however, another train which calls for special attention, the "Farther North" express, north on Fridays and south on Saturdays during the height of the season. Unfortunately, the writer could not utilise it, as it ceased to run for the season on September 1. It is, however, an interesting train, and ever since its first introduction by the late Highland Railway has constituted a popular service.

On Fridays it awaits the arrival at Inverness of the direct section of the 12 noon express from Perth.* This train has through carriages from both Glasgow, Buchanan Street (L.M.S.R.) and Edinburgh, Waverley (L.N.E.R.). From Aviemore one section proceeds direct to Inverness, the other taking the old route *via* Forres. The former section reaches Inverness at 3.50 p.m., so that passengers can transfer comfortably to the "Farther North" express which leaves at 4.10 p.m. This train is, moreover, a real express, in that it calls only at Dingwall, Tain, Bonar Bridge, The Mound, Golspie, Brora, Helmsdale, and Georgemas Junction, with no conditional calls whatever, and is allowed 5 hours 25 minutes only for the 161¼ miles to Wick. It includes, of course, Thurso through carriages, while the restaurant car goes right through to Wick.

* At one period of its history it started from Aviemore and passed Inverness without calling.

The up train, on Saturdays, leaves Wick at 9.50 a.m., the Thurso departure being by the usual 9.45 a.m. branch service. The express varies its stops slightly, these being Georgemas Junction, Kinbrace, Helmsdale, Brora, Golspie, Lairg and Bonar Bridge only, a further instance of adaptation to traffic characteristics. The complete journey takes 5 hours 40 minutes, while the Inverness arrival time, 3.30 p.m., makes a good connection with the 3.45, 4.15 and 4.35 Glasgow and Edinburgh and English sleeping-car expresses.

So far as branch services north of Inverness are concerned, it will be sufficient to mention that the Black Isle line has five trains each way daily and two others on Thursdays and Saturdays; the local Strathpeffer service provides 12 trips each way from and to Dingwall (third-class only); the Skye line has two through trains from Dingwall and one on Wednesdays and Fridays, and three returning, one at altered times on Wednesdays and Fridays. The Dornoch Light Railway has four services each way, one altered in times when the down "Farther North" express is running; and the Wick and Lybster Light Railway has five services regularly (one altered on Wednesdays and Saturdays) and one on Thursdays and Saturdays. By the combination of Thurso branch connections and through Wick-Thurso runs, the Thurso branch has five or six services each way, while the Georgemas Junction-Wick section has five or six trains, in each case with variations on certain days.

**Mr. F. W. Brewer's articles on "Modern Locomotive Practice on the Great Western Railway" will be continued Next Month.**

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1. **CAMPBELTOWN AND MACRIHANISH RAILWAY.** *Photo. J. McInnes.*
2. **CAMPBELTOWN AND MACRIHANISH RAILWAY.** *Photo. G. R. Porter.*
3. **ROTHESAY AND ETTRICK BAY LIGHT RAILWAY.** *Photo. E. A. Gurney-Smith.*

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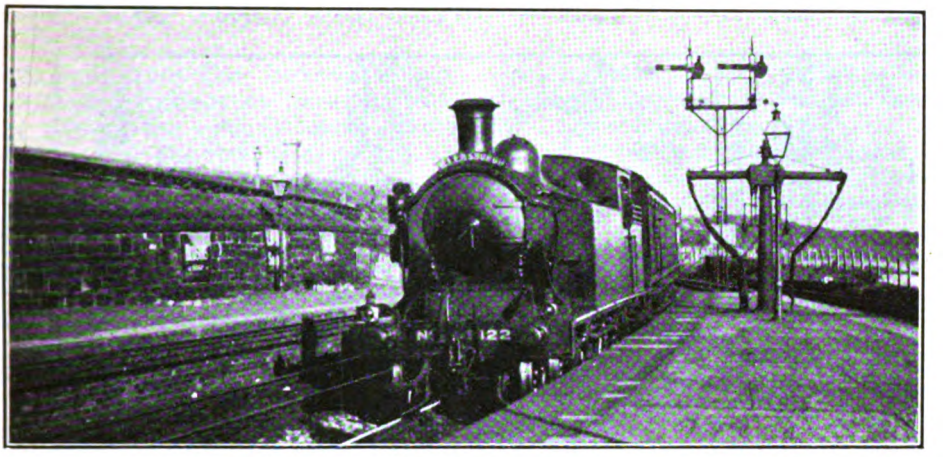

*Photo.*] GLASGOW-HELENSBURGH TRAIN AT CRAIGENDORAN. [*C. J. L. Romanes.*

# The Forth & Clyde Junction Railway.

By "INDICATOR."

ALTHOUGH worked for so many years by the late North British Company, and by most people regarded as part of that system, the Forth and Clyde Junction is one of those railway companies which retained their independent constitution, had their own boards of directors, held their own annual meetings, and had a secretary, if no other executive officers, until the Railways Act of 1921 caused their incorporation into one of the big companies of to-day, the London and North Eastern in this case. It was originally constituted in 1853, but the line was worked by the North British Railway, which company leased it in 1875, this arrangement continuing until the end of 1922, when it became part of the London and North Eastern system.

The line commences by a junction with what is now the L.M.S.R. (originally the Scottish Central and then the Caledonian) just north of Stirling station, into which running powers were exercised. Just beyond station precincts, however, it curves westward, to follow generally the course of the River Forth—here a very different stream from that seen by those who cross by the L.M.S.R. bridge at Alloa or the great Forth Bridge of the East Coast Route. It proceeds across country, connecting at Buchlyvie and Gartness Junction with the North British Blane Valley line from Glasgow and the Aberfoyle branch, so that trains on the Glasgow-Aberfoyle service use the Forth and Clyde Junction line between the points named. From Gartness Junction the Forth and Clyde line continues until, just south of Balloch station, it joins the Dumbarton and Balloch Joint Line, by which both the L.N.E.R. and L.M.S.R. reach Balloch and Balloch Pier stations from Glasgow.

In the ordinary way, the Forth and Clyde line ranks merely as a route serving various villages and small towns, mostly in the valley of the Forth, providing also a direct connection between Stirling and places east thereof and Loch Lomond, together with the valley of the River Leven and thence with the Clyde. In summer, however, it constitutes a very important link in the facilities provided by the L.N.E.R. in connection with the famous Trossachs Tour, while it can also be used for various other tours, including the L.N.E.R. versions of the "Three Lochs" and other tours to which reference will be made later. For the present, it will be sufficient to give a few descriptive notes as to the line itself.

Leaving the L.M.S.R. at Stirling, the



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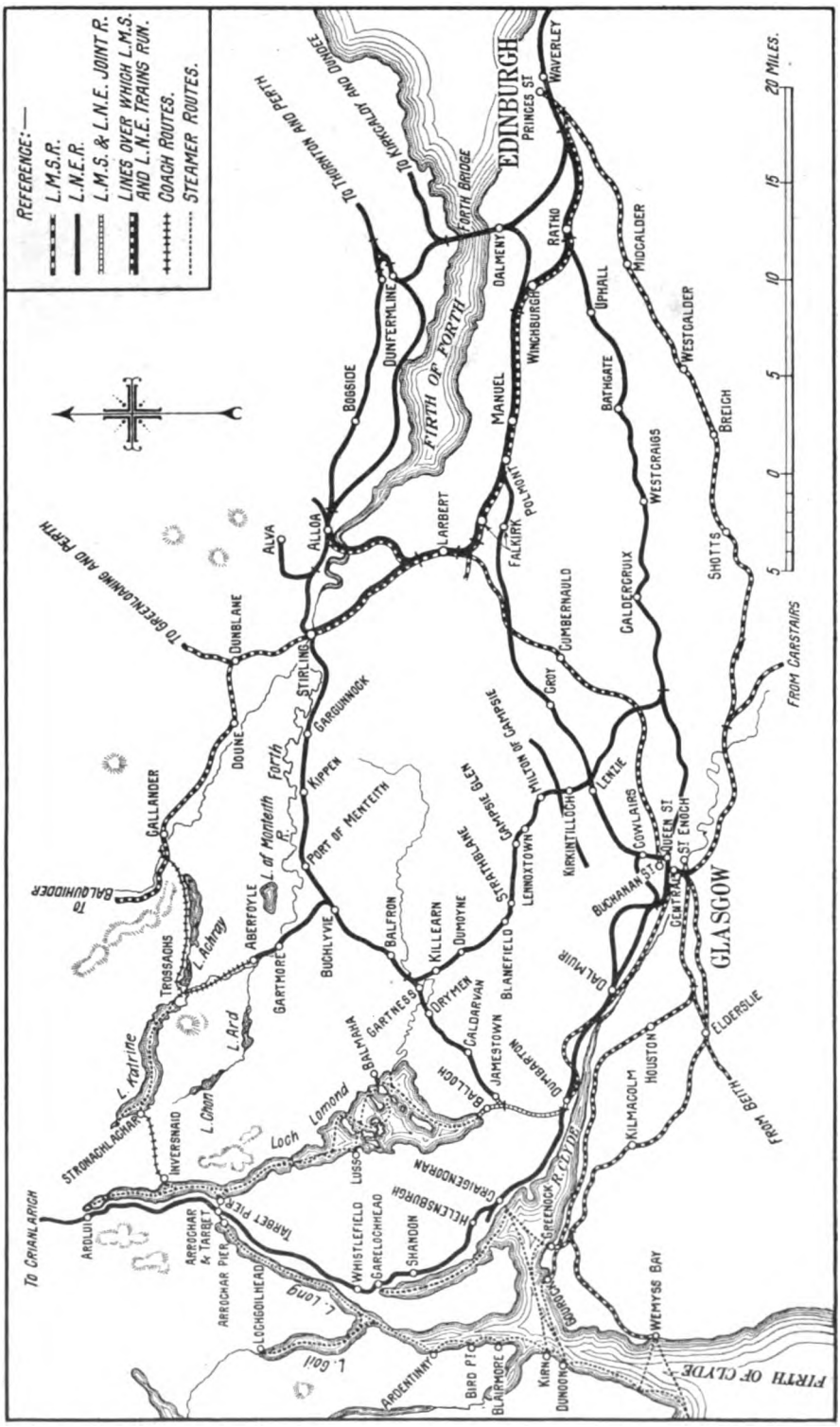


MAP SHOWING THE FORTH AND CLYDE JUNCTION RAILWAY AND ROUTES CONCERNED IN THE "TROSSACHS" AND "THREE LOCHS" TOURS.

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Forth and Clyde line becomes single-track, with crossings at most stations, as it follows the general course of the River Forth. The river is now quite an ordinary stream, but is frequently seen in picturesque surroundings, while beyond, to the north, high hills and mountains gradually come more and more into view. The intermediate stations on the first stage are: Gargunnock, Kippen, Ladylands (a platform at which certain trains call) and Port of Menteith. Connection is made with the Aberfoyle branch at Buchlyvie, these trains (usually through to and from Glasgow, but connecting with Stirling-Balloch trains) also serving Balfron station.

At Gartness Junction, Glasgow trains turn south, avoiding Gartness station, which is on the Balloch line only. A picturesque river, which eventually finds its way into Loch Lomond, accompanies the line until it turns in a north-westerly direction after its valley has been crossed by the railway and Drymen station is reached. Another stretch of picturesque country and Caldarvan station is reached, and with further scenic interest afforded by local streams, one of which runs directly alongside the line for some distance, Jamestown is approached. Here there are several factories and industrial premises and this place, with its neighbour Balloch, has considerable importance in this respect. Finally, the line crosses the River Leven (here of fair width, and in summer alive with houseboats' small yachts, &c.), to join the Dumbarton and Balloch line, joint L.M.S. and L.N.E. There is an extension beyond the town station at Balloch to Balloch Pier, and trains running in connection with steamers on Loch Lomond work to and from the pier.

For completeness, and in view of its associations with the Forth and Clyde line, a few remarks may also be given in regard to the North British Blane Valley line, used by Glasgow–Aberfoyle trains. The line leaves the direct Glasgow–Edinburgh main line at Lenzie Junction. From Kirkintilloch, it follows the River Kelvin for some distance, but at Kelvin Valley Junction leaves the Kilsyth route and passes under the Torrance–Kilsyth line, to traverse attractive riverside country as far as Lennoxtown. This and the intervening station—Milton of Campsie—serve favourite residential districts for Glasgow business people.

Lennoxtown is a prettily situated town under the shadow of the neighbouring hills. This is the terminal point for many trains, so that the remainder of the route is single track. About a mile further ahead is Campsie Glen, a charming spot, beautified by cool and shady dells and sparkling waterfalls. As the railway ascends a spur of the Campsie Fells, the pleasantly situated village of Strathblane marks entry into the valley of the Blane Water. To the north, the bold ridges of the Campsie Falls present striking features as they undulate in irregular contour, their tree-clad slopes arresting and delighting the eye of the beholder. At hand is Duntreath Castle and the hill of Dumgoyne. The little hillside station of this name is the stopping place for The Moss, Killearn.

Blanefield is also a terminal for certain trains, so that the service onwards to Gartness is not a heavy one. There is no station on this route at Gartness, though there is one on the Forth and Clyde line, but approaching the junction there is a crossing loop. Balfron and Buchlyvie stations, in the "Beautiful strath of the Endrick," are served by both series of trains. At Buchlyvie there are the usual two platforms, and these are used as convenient to meet the needs of inter-connecting trains. Beyond the station the two lines combine and immediately separate to form the two single-line routes, one to Aberfoyle and the other to Stirling. Aberfoyle trains continue across Flanders Moss, a picturesque stretch of moorland. The line crosses the Kelty Water and the River Forth, now a small stream, near Gartmore station.

At Aberfoyle, the station lies below the shadow of high hills, on the bank of the River Forth. The village is pleasantly situated, giving evidence of the picturesque character of the route followed onwards by charabancs on the famous "Trossachs Tour." It figures prominently in the works of Sir Walter Scott. The village is a beautiful spot on its own account, and many summer visitors make it their headquarters. There are several good hotels, notably the Bailie Nicol Jarvie, and there is ample accommodation

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GLASGOW TRAIN AT ABERFOYLE.

BALLOCH TOWN STATION.

STIRLING-BALLOCH AND GLASGOW-ABERFOYLE TRAINS AT BUCHLYVIE.

*Photos. by J. F. Gairns.*

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for visitors in considerable numbers. The road to the east leads to the lovely Lake of Monteith—the only "lake" in Scotland—with its ruins of the ancient stronghold of the Earls of Menteith. Another beautiful road leads up to the historic Pass of Aberfoyle by the shores of Loch Ard and Loch Chon to Stronachlachar. Not less interesting and beautiful is the road which runs south-westward up to Duchray Water. The tourist coaching road to the Trossachs, however, is northward from Aberfoyle. This road winds steeply up the mountainside behind the village.

All trains on the Forth and Clyde line call at each station, and one each way at Ladylands Platform (between Port of Menteith and Kippen stations) daily, with a market service on Thursdays. They leave Stirling at 6.35, 7.20 (to Buchlyvie only), 10.37 a.m. and 2.57, 4.10 (not Saturdays, to Balfron only), and 6.6 p.m., with the 5.45 p.m. from Balfronto Balloch. Returning, there are trains from Balloch at 6.30 and 8.24 a.m. and at 3.34 and 6.43 p.m. from Balloch Pier to Stirling, and at 8.16 and 11.25 a.m. from Buchlyvie to Stirling, and at 4.55 p.m. from Balloch (4.50 p.m. from Balloch Pier on Tuesdays, Wednesdays, and Saturdays) to Balfron.

On the Blane Valley line there is a fairly frequent service, especially at the hours of residential travel, between Glasgow (Queen Street, usually High Level) and Lennoxtown, with others which terminate at Blanefield. One or two of the business trains are, moreover, more or less fast. The following trains work right through to Aberfoyle (in some instances with a wait at Buchlyvie) :—8.4 and 9.50 a.m., 1.6 (Saturdays only), 1.38, 2.40 (Saturdays only), 5.5 (not Saturdays), and 5.44 p.m. From Aberfoyle trains leave for Glasgow at 7.10, 8.2, 10.32, 4.10, 5.49 (Saturdays only), and 6.53 p.m. There are also two or three local runs between Aberfoyle and Buchlyvie.

To appreciate further references, it is necessary to outline generally the standard features of the Trossachs Tour, perhaps the best-known and most popular of all the Scottish rail and railway steamer combination tours. This tour is operated by both the L.N.E.R. and the L.M.S.R., but, whereas the latter runs its trains to Callander in one direction, the former makes Aberfoyle its essential transferring point. The Trossachs-Stronachlachar steamer stage on Loch Katrine and the road stage thence to Inversnaid are common to both forms of the tour, while both use the jointly-owned Loch Lomond steamers between Inversnaid and Balloch piers. From Balloch returning passengers proceed to Glasgow by using the joint line between Balloch and Dumbarton, though L.N.E.R. passengers have the alternative, in the case of those from Edinburgh, of using the Forth and Clyde route. The Glasgow route is, however, available for L.N.E.R. Edinburgh passengers, while they must return that way in the case of the L.M.S.R.

It will, of course, be understood that the tour, together with certain modifications which are available, can be made either way round, going *via* Callander or Aberfoyle and returning *via* Balloch, or going *via* Balloch and returning *via* Callander or Aberfoyle. The alternatives thus involved will be clearly seen from the accompanying map, which also shows another tour, rather less known—at any rate, outside the Edinburgh and Glasgow districts.

This, the "Three Lochs Tour," is based upon Balloch and upon Craigendoran, Gourock or Greenock, on the Firth of Clyde. It includes the use of Loch Lomond steamers between Balloch Pier (served by rail connections as in the case of the Trossachs Tour) and Tarbet Pier; road transport between Tarbet Pier and Arrochar Pier on Loch Long (a short stage of about two miles not included in the through fair); Clyde steamer between Arrochar Pier, Lochgoilhead and Craigendoran, Gourock or Greenock; and rail between the last-mentioned piers and Glasgow (or Edinburgh). This tour is well worth making in addition to the Trossachs Tour, though it should be regarded as a companion rather than as a supplement thereto. The cost is, moreover, very moderate, as will be seen from the following particulars :—Glasgow, first rail and cabin steamer, 8s.; third rail and cabin steamer, 6s. 3d.; third rail and steerage steamer, 5s. 6d. From Edinburgh, first rail and cabin steamer, 18s. 6d.; third rail and cabin steamer, 12s.; third rail and steerage steamer, 11s. 3d. These fares do not include the short road stage

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TARBET HOTEL, LOCH LOMOND, FOR COACHES TO ARROCHAR.

LOCH LOMOND JOINT STEAMER, "PRINCE GEORGE."

*Photos.*] LUSS PIER, LOCH LOMOND. [*J. F. Gairns.*

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(about two miles) between Tarbet and Arrochar, or pier dues on Loch Lomond and Loch Long, but these supplementary charges represent but a small additional expenditure, while the tour can be made in stages to suit individual convenience.

In conclusion, a few notes may be given in regard to the train and steamer services in connection with these tours. So far as Glasgow is concerned, there is no need to go into close detail. For the Trossachs Tour passengers leave Queen Street (H.L.) at 9.50 a.m. for Aberfoyle, or Queen Street (L.L.) at 10.50 a.m. for Balloch, and arrive back at 8.21 and 8.42 p.m. respectively, in both cases at Queen Street Low Level. For the Three Lochs Tour, the 9.20 a.m. from Queen Street (L.L.) is used to Craigendoran, and the 10.50 a.m. to Balloch, the return arrivals being 4.39 and 5.23 p.m., respectively.

In the case of Edinburgh passengers, however, there are several items of interest, notably in regard to the 9.15 a.m. from Waverley. This calls only at Dunfermline and Alloa to Stirling, the route involving crossing the Forth Bridge, always an attraction, and an interesting journey onwards. It includes, however, through carriages for both Aberfoyle and Balloch, and these are transferred at Stirling, after arrival at 10.26 a.m., to the 10.37 a.m. Forth and Clyde train. This reaches Buchlyvie at 11.10 a.m., and waits the arrival of the 9.50 a.m. from Glasgow on the opposite platform. During the six minutes' wait, the Aberfoyle through coach is transferred to the Glasgow train, and the respective trains resume their journeys at 11.16 and 11.18 a.m. Returning, the 6.53 p.m. from Aberfoyle makes a similar interchange with the 6.43 p.m. from Balloch Pier, but at Balfron instead of Buchlyvie.

Passengers can, however, travel *via* Glasgow so far as Balloch is concerned, in which case they can travel between Edinburgh and Glasgow by direct main-line expresses or, if they want to find a further alternative, *via* the industrially interesting but less picturesque Bathgate route, so far as train services permit. It is, in fact, generally necessary to travel *via* Glasgow in the case of the Three Lochs tour, so far as the Craigendoran stage is concerned, while this is usually done also *via* Balloch, though the tickets allow of the Edinburgh-Stirling-Balloch route being taken, and the writer would personally recommend it one way. This is most convenient on the outward journey, as 9.15 a.m. is a convenient departure from Edinburgh and the train connects with the 12 noon Loch Lomond steamer from Balloch Pier, whereas if going *via* Craigendoran it is best to return from Balloch Pier to Glasgow and thence continue to Edinburgh by main-line train. If the journey is broken at a Loch Lomond pier the return working of the Balloch-Edinburgh coaches is very convenient, though the arrival at Waverley is rather late, 9.56 p.m.

The Loch Lomond steamer services which apply to these trains are usually the 9.25 a.m. and 12 noon from Balloch (Trossachs) or the 12 noon (Three Lochs) to Inversnaid and Tarbet respectively, and the 4.40 p.m. from Inversnaid and the 2.15 or 5 p.m. from Tarbet. As both tours can be made in stages, any of the steamer services may be used to suit personal convenience.

In the case of the Three Lochs tour, the Loch Long and Loch Goil sections involve the use of one or other of the following two services:—The first is by the 10.15 a.m. L.N.E.R. steamer from Craigendoran Pier, after the arrival of the 9.20 a.m. from Queen Street (L.L.). This steamer first crosses to Gourock, so that it can take on L.M.S.R. passengers from Glasgow Central at 9.3 a.m. It then calls at Kirn and Dunoon, before turning north. Calls are made at Blairmore and Ardentinny piers, after which the steamer proceeds up the beautiful stretches of Loch Goil, reaching Lochgoilhead at 12.5 p.m. Thence it returns as far as Bird Point to reach Loch Long, whose mountain-enclosed waters are traversed to Arrochar Pier, reached at 1.5 p.m. Passengers for Tarbet then make their way to Loch Lomond, while those who have come from Loch Lomond embark to leave Arrochar at 2.10 p.m. The return service has similar calls, but passengers go direct to Craigendoran (due 4.25 a.m., Glasgow 5.23 p.m.), those for Gourock crossing from there.

The second service is more particularly designed for L.M.S.R. passengers. It leaves Greenock (Princess Pier, train

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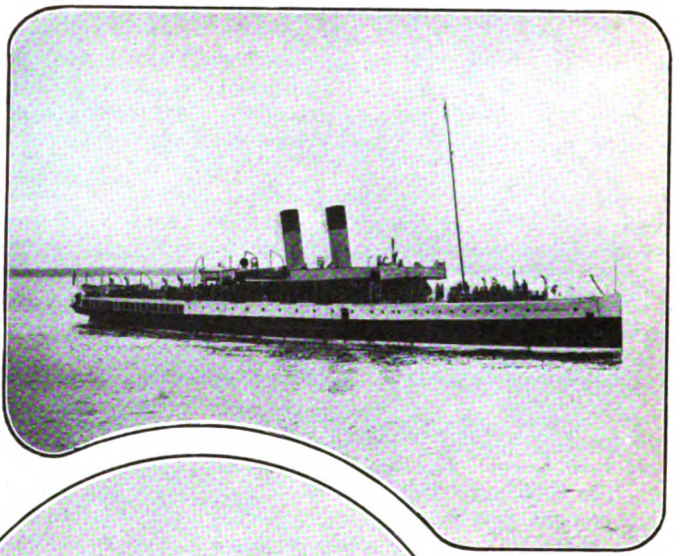
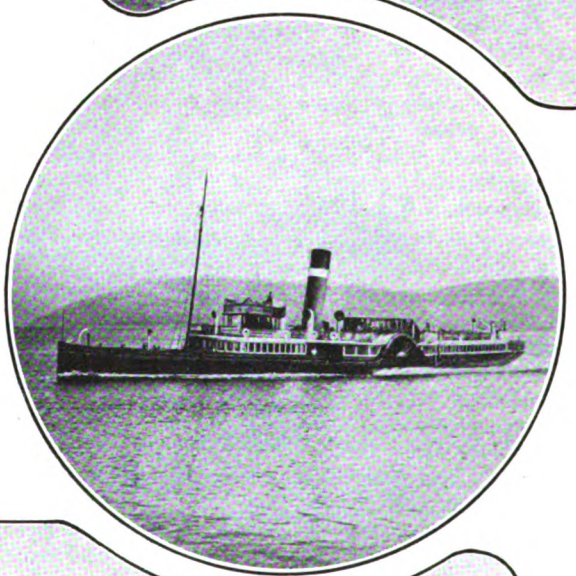
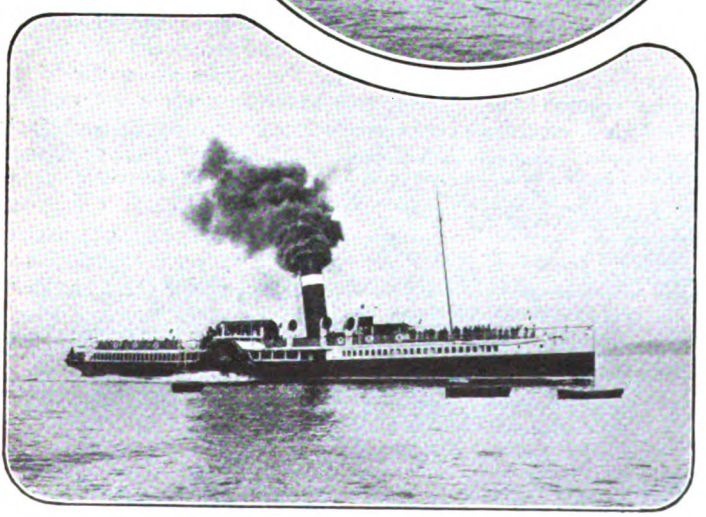


L.M.S.R. TURBINE STEAMER, "DUCHESS OF ARGYLE," CLYDE SERVICES.



L.N.E.R. STEAMER, "KENILWORTH," CLYDE SERVICES.



L.N.E.R. STEAMER, "WAVERLEY," CLYDE SERVICES.

*Photos. C. J. L. Romanes.*

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from St. Enoch) at 11.25 a.m., and Gourock (train from Glasgow Central) at 11.40 a.m. The steamer calls at several piers not served by the earlier boat, but takes a similar route, going first up Loch Goil to Lochgoilhead and then up Loch Long to Arrochar. Return from the latter place is at 3.10 p.m.

Finally, although we are now getting a good way from the Forth and Clyde Junction Railway, it may be mentioned that a desirable development of the facilities indicated is provided by travelling the whole length of Loch Lomond by steamer to Ardlui Pier and returning by West Highland train, or adopting the reverse procedure. This is very convenient for Edinburgh passengers, in that they have a through carriage for Ardlui by rail on the 10.5 a.m. from Waverley, there is a corresponding through vehicle on the 6.43 p.m. from Ardlui, and they can, of course, use the Edinburgh-Balloch through carriages as above indicated. West Highland train services can also be used to and from Arrochar and Tarbet stations. An important feature of this alternative to the tours outlined is, moreover, that between Helensburgh and Arrochar the line follows the waters of Loch Long whose most beautiful stretches are thus in full view, while the Arrochar and Tarbet-Ardlui section is directly alongside Loch Lomond.

## AN OLD SCOTTISH LOCOMOTIVE IN MODERN GUISE.

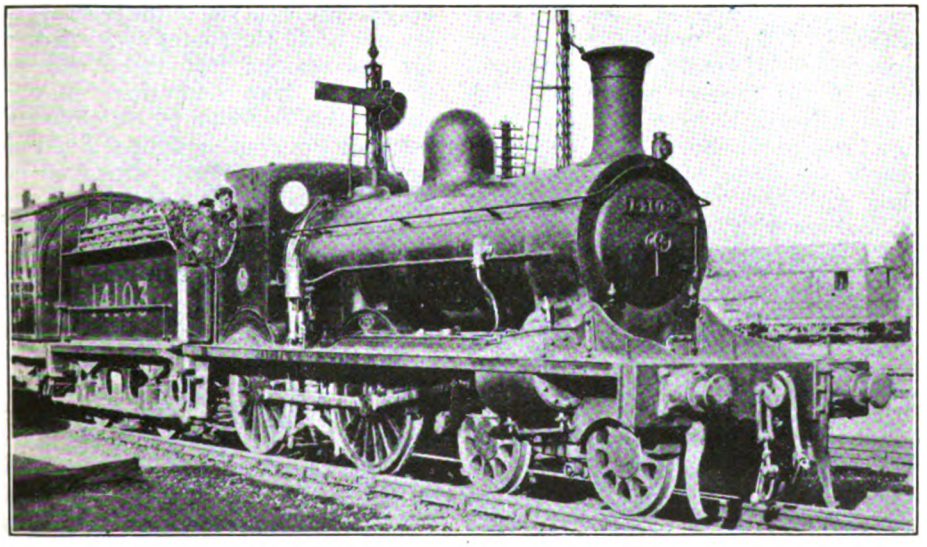

*Photo.*] "OBAN BOGIE" 4-4-0 No. 14103 AT STIRLING. [*R. D. Stephen.*

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# The Main-Line Gradients of British Railways.

By "VOYAGEUR."

IT is a little over twenty-five years since the RAILWAY MAGAZINE last began to reproduce a series of profiles representing the gradients of the chief British main lines. As was mentioned in the brief note of last month's issue introducing this new series, the profiles previously given suffered from the lack of a uniform scale or treatment, with the result that comparisons of the relative difficulty of different routes, by means of a study of these profiles, was far from easy. Certain important lines were omitted; others, again, have been completed—such as the Westbury and Wycombe "cut-offs" of the Great Western Railway—since the profiles of those railways were illustrated and described. In view of the constant desire expressed by a later generation of readers, who have come into being since the last series of articles was completed, for a fresh "edition" of these profiles, an entirely re-drawn series of gradient diagrams commences in the present article with the London & North Eastern main line from King's Cross to Edinburgh. It is intended to carry on these articles unbrokenly, dealing with each of the four groups in turn, and covering all routes over which express train running is normally performed.

A few notes are necessary, as a preliminary, to explain certain principles which have been followed in the drawing out of the profiles. The scales employed, both vertical and horizontal, are uniform throughout; the vertical scale, however, is not shown, as it has been necessary in certain cases slightly to vary the height above datum in order to allow sufficient space for the figures in the profiles. But for each respective steepness of inclination exactly the same slope of line has been employed, so that direct visual comparison of gradient with gradient is readily possible. For purposes of simplification, gradients flatter than 1 in 1,000 have, for the most part, been regarded as level, as it is difficult, on so small a scale as this, to indicate which way these very flat gradients slope without a distortion of the profiles for the purpose.

Where possible, too, the profiles have been made easier to read by the averaging of frequent short changes of gradient—where the successive lengths do not vary greatly in inclination—into one mean inclination for each series. It is possible, therefore, that the gradients shown will not always be in exact agreement with the gradient posts at the line-side. Another reason for possible disagreement is that minor changes in grading frequently occur as the result of gradual settlements in banks, relaying and the packing up of track on new ballast, and for other causes, resulting in eventual modification of the original figures. These new profiles are based on the latest information available, and will be found to afford a reasonably accurate survey of the general grading lay-out of all the routes concerned. But, for the reasons just mentioned, minor differences here and there may quite conceivably be found by the close student between the grading figures given on the profiles and the figures displayed on the line-side gradient boards.

Useful information will also be found on the profiles as to various other matters influencing the running of trains. The location of service slacks is shown; but it is thought better not to give the actual restriction figures in each case, as these also are subject to frequent variation as curves are modified, tracks are realigned, and so on. Distinction is made, however, between severe service slacks of 30 m.p.h. or less, and those of a moderate or slight character. The site of track water-troughs is also indicated, as well as of tunnels and the more notable viaducts. Accompanying the article are tables giving the distances, to the nearest tenth part of a mile, to all the stations and the principal signal-boxes or summit points along each route, so that the collected articles may prove a *vade mecum* in particular to those readers who are



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interested in the subject of train-timing. Collected together, the completed series of articles will be in the nature of a "handbook" of British railways. We will now turn to the first set of profiles.

## I. London & North Eastern Railway.

*King's Cross to Edinburgh.*

*Mile-posts :*—Down side of line, King's Cross to Berwick; up side, Berwick to Edinburgh. G.N. Series: King's Cross (zero) to York (N.E. posts from Shaftholme Junction). N.E. Series: York (zero) to Newcastle; Newcastle (zero) to Berwick. N.B. Series: Berwick to Edinburgh (zero).

The gradient of 1 in 200, which rules over the greater part of the first 250 miles out of King's Cross, represents the limit of desirable steepness in the case of a main line designed to permit of heavy load haulage at high speeds as well as very heavy freight traffic. It will be seen that the only steeper sections than this are the first 1½ miles out of King's Cross, to Holloway, averaging 1 in 107; a very short length of 1 in 150 just before Yaxley; the 3 miles at 1 in 178 up to Stoke Summit box; and 1¼ miles at the same gradient just before Retford. The principal summit points attained are at Potter's Bar and Woolmer Green (between Welwyn and Knebworth), the latter being followed by the well-known high speed stretch of the old Great Northern, from Stevenage steeply down to Arlesey, and then at easier but generally favourable grades to Huntingdon; at Leys Box, beyond Huntingdon; at Stoke Summit; and later on at the progressively decreasing altitudes of Markham and Piper's Wood Summits, the last-mentioned, between Bawtry and Rossington, being a very modest "hump." Indeed, for 111 miles northwards from the 137½ mile-post, there are no grades worth mentioning, and for 75 miles from mile-post 152 the line is but little removed from dead level, as it crosses from south to north the Great Plain of York. Allowance has to be made in the timings, however, for the severe slowing over the swing-bridge at Selby, and the sharply curved approaches to York, especially at the north end of that station.

Through the northern part of the County of Durham the grades increase in severity, from beyond Ferryhill (249 miles) to Newcastle. There are several short stretches at 1 in 150, or thereabouts, but the worst gradient is the 1 in 101-120 from Relly Mill Junction down into Durham, the viaduct approach to which from the south is subject to a very severe speed restriction. This operates to the worst effect against up trains, as the drastic slowing is followed by the ascent of the gradient. The whole of the section of line from Ferryhill to Newcastle—and, indeed, for some 20 miles northwards—lies through a colliery area, so that temporary slowings for pitfall subsidences are not uncommon. It is for this reason that the East Coast timings over this section are maintained on a very easy basis, to allow for possible slacks, and for generally cautious running.

Mile-posts from York cease at Newcastle, whence a new series begins and continues to Berwick. Here the North British posts, measured from Edinburgh, commence; these are found on the up side of the line instead of the down.

North of Newcastle, after the sharp curves have been negotiated through the Manors to Heaton, the grading returns to the Great Northern standard of 1 in 200 or easier for 33 miles to Alnmouth, with a summit level at Cramlington, midway between Newcastle and Morpeth, a severe slack round the curve through the latter station, and fairly level running onwards from there. From Alnmouth the engines have to face the 4 miles at 1 in 170 of Longhoughton bank, followed by the shorter 1 in 150 descent of Christon Bank; this leads to a further stretch of line with 1 in 200, or the slightly steeper 1 in 190, as a ruling grade. This grade, however, becomes trying in the continuous length of 22 miles, from Goswick, past Tweedmouth and Berwick, nearly to Grant's House, broken only by 2 miles of slightly falling grades from Scremerston to Tweedmouth and 3 miles northward from Burnmouth; Berwick, also, must be passed at reduced speed. Then, from Grant's House, we have the hardest gradient between King's Cross and Edinburgh, the famous Cockburnspath bank being inclined downwards for 4¼ miles continuously at 1 in 96. From the foot of this formidable incline the grades are of the

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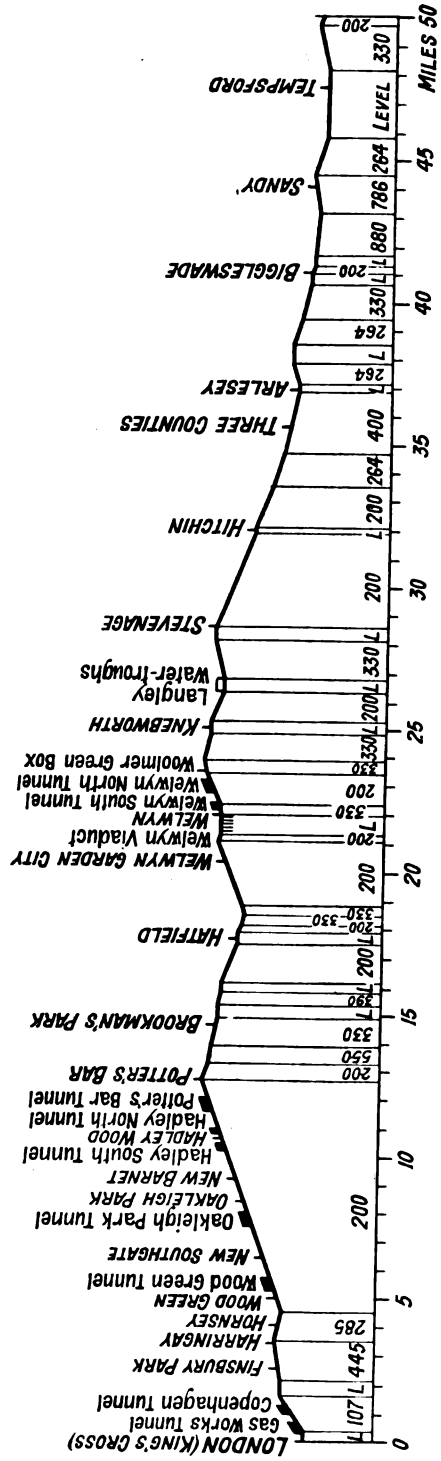


GRADIENT PROFILE, L.N.E.R. MAIN LINE, SECTION I.

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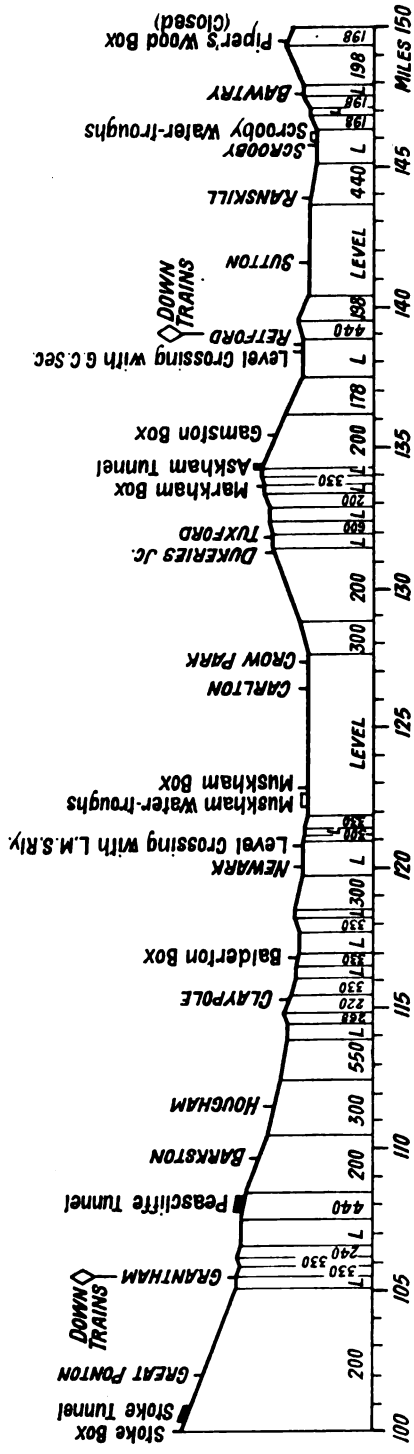


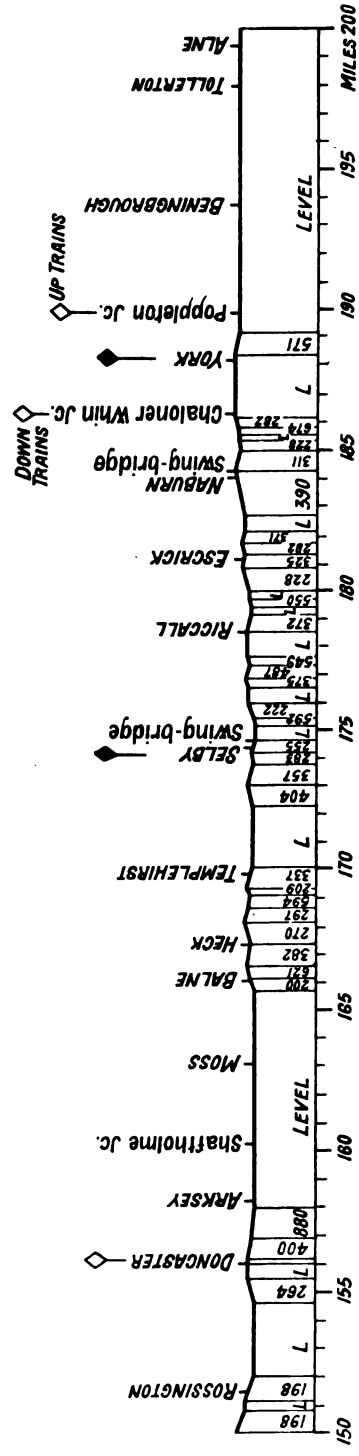


GRADIENT PROFILE, LONDON & NORTH EASTERN RAILWAY—SECTION II.



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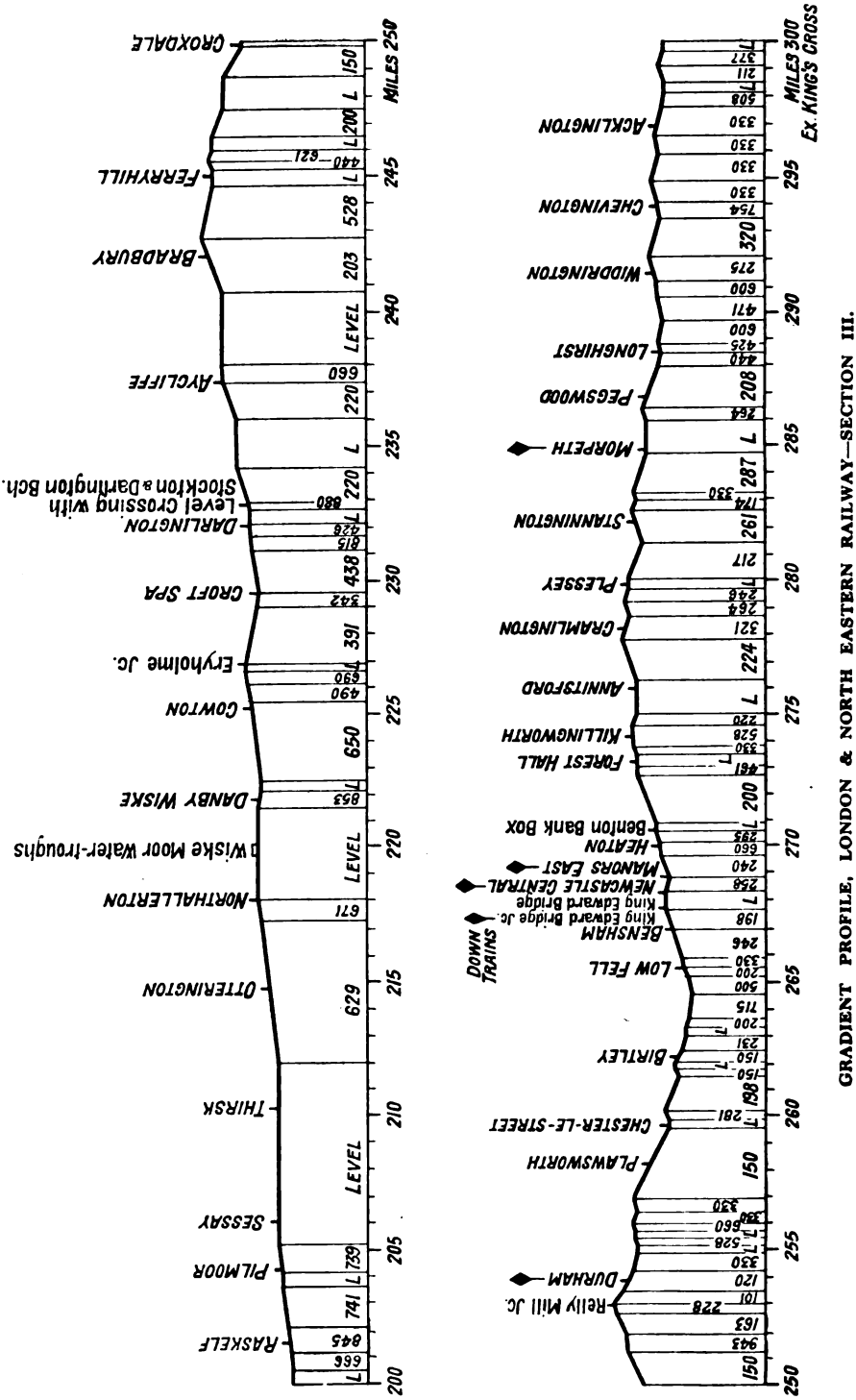


GRADIENT PROFILE, LONDON & NORTH EASTERN RAILWAY—SECTION III.

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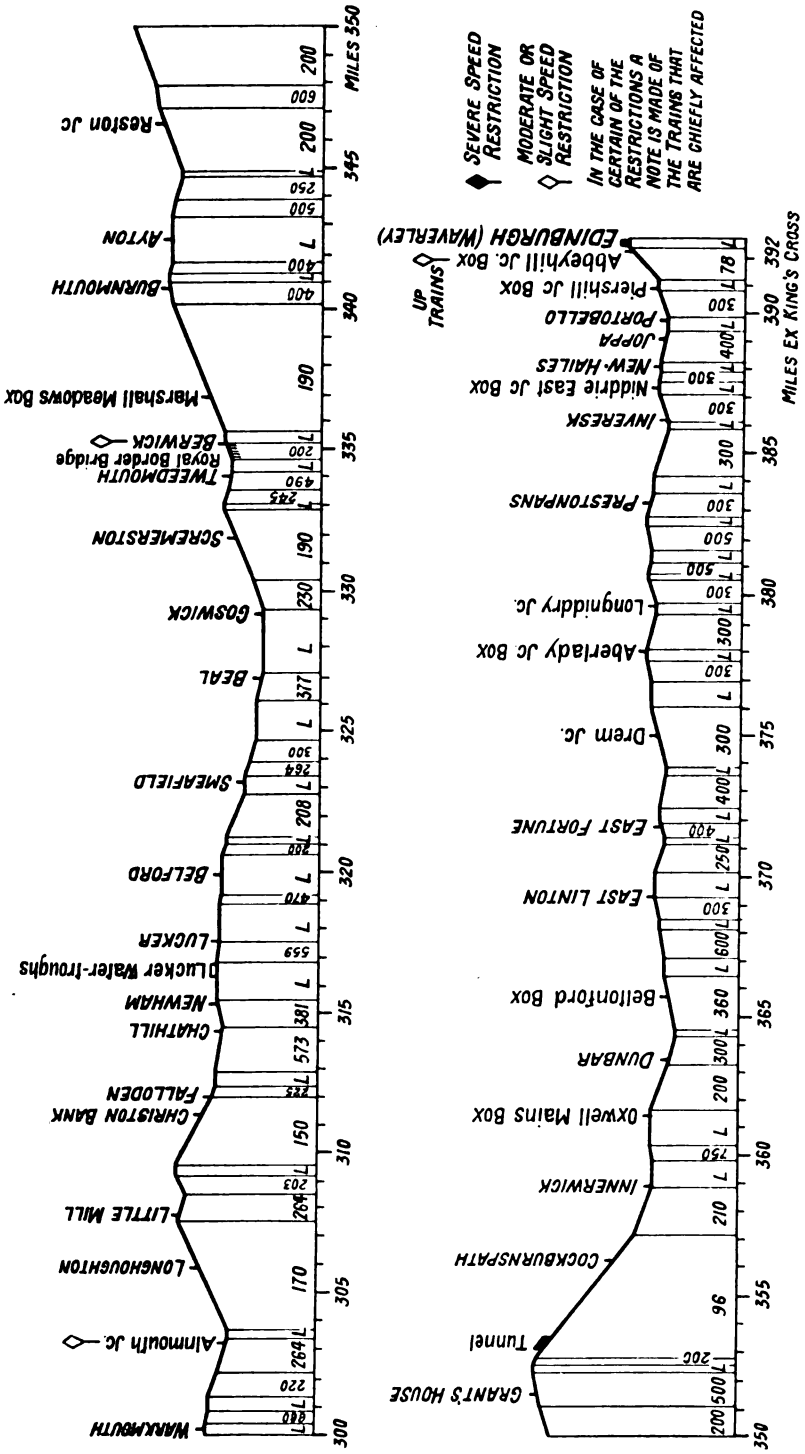
SEVERE SPEED RESTRICTION
MODERATE OR SLIGHT SPEED RESTRICTION
IN THE CASE OF CERTAIN OF THE RESTRICTIONS A NOTE IS MADE OF THE TRAINS THAT ARE CHIEFLY AFFECTED
UP TRAINS
EDINBURGH (WAVERLEY)
Abbeyhill Jc. Box
Piershill Jc Box
PORTOBELLO
JOPPA
NEW HAILES
Niddrie East Jc Box
INVERESK
PRESTONPANS
Longniddry Jc.
Aberlady Jc Box
Drem Jc.
EAST FORTUNE
EAST LINTON
Belhonford Box
DUNBAR
Oxwell Mains Box
INNERWICK
COCKBURNSPATH
Tunnel
GRANTS HOUSE
MILES EX KING'S CROSS
392 390 385 380 375 370 365 360 355 350
78 300 400 300 500 300 300 300 300 400 250 400 300 600 300 200 500 200
96 210 200 300 360 600 400 250 300 L L L L L L L L L L L L L L L L L L L
Reston Jc
AYTON
BURNMOUTH
Marshall Meadows Box
BERWICK
TWEEDMOUTH
Royal Border Bridge
SCREMERSTON
GOSWICK
BEAL
SMEAFIELD
BELFORD
LUCKER
Lucker Water-troughs
NEWHAM
CHATHILL
CHRISTON BANK
FALLODEN
LITTLE MILL
LONGHOUGHTON
Alnmouth Jc.
WARKWORTH
MILES 350 345 340 335 330 325 320 315 310 305 300
200 600 200 250 500 400 400 190 200 275 490 200 190 230 377 300 264 208 200 470 559 381 573 225 150 203 264 170 220 240 L L L L L L L L L L L L L L L L L L L

easiest character, with the sole exception of the final mile at 1 in 78 up into Waverley, which affords little hindrance to down expresses, and is of substantial accelerative value to up trains. The London & North Eastern Railway thus enjoys what is probably the easiest of the three main routes from London to Scotland. Gradients steeper than 1 in 200 (or, to be precise, 1 in 198) are confined to 33 miles out of 392¾; 1 in 150 or steeper figures to the extent of 14½ miles only; and 1 in 110 or steeper is seen only for 6¾ miles.

## DISTANCES—KING'S CROSS TO EDINBURGH.

Names in italics are signal-boxes, the position on up or down side of line being indicated in each case.

| King's Cross—York. | Miles. |
|---|---|
| KING'S CROSS | 0·0 |
| Finsbury Park | 2·6 |
| Harringay | 3·4 |
| Hornsey | 4·0 |
| Wood Green | 5·0 |
| New Southgate | 6·4 |
| Oakleigh Park | 8·4 |
| New Barnet | 9·2 |
| Hadley Wood | 10·6 |
| Potter's Bar | 12·7 |
| Brookman's Park | 14·6 |
| HATFIELD | 17·7 |
| Welwyn Garden City | 20·3 |
| Welwyn North | 22·0 |
| *Woolmer Green* (*up*) | 23·5 |
| Knebworth | 25·0 |
| *Langley* (*down*) | 27·1 |
| Stevenage | 28·6 |
| HITCHIN | 31·9 |
| Three Counties | 35·7 |
| Arlesey | 37·0 |
| Biggleswade | 41·1 |
| Sandy | 44·1 |
| Tempsford | 47·5 |
| St. Neot's | 51·7 |
| Offord | 56·0 |
| HUNTINGDON | 58·9 |
| *Levs* (*up*) | 62·0 |
| Abbot's Ripton | 63·5 |
| *Connington* (*up*) | 67·4 |
| Holme | 69·4 |
| Yaxley | 72·6 |
| *Fletton Junction* (*down*) | 75·0 |
| PETERBOROUGH | 76·4 |
| *New England North* | 77·5 |
| *Werrington Junction* (*down*) | 79·5 |
| *Helpston* (*up*) | 81·9 |
| Tallington | 84·8 |
| Essendine | 88·6 |
| Little Bytham | 92·2 |
| Corby | 97·1 |
| *Stoke Summit* (*up*) | 100·1 |
| Great Ponton | 102·0 |
| GRANTHAM | 105·5 |
| Barkstone | 109·7 |
| Hougham | 111·5 |
| Claypole | 115·4 |
| NEWARK | 120·1 |
| *Muskham* (*down*) | 122·8 |
| Carlton-on-Trent | 126·4 |
| Crow Park | 127·4 |
| Dukeries Junction | 131·3 |
| Tuxford | 131·9 |
| *Markham Summit* (*up*) | 133·7 |
| *Gamston* (*down*) | 135·5 |
| RETFORD | 138·6 |
| Sutton & Barnby Moor | 141·7 |
| Ranskill | 143·9 |
| Scrooby | 145·8 |
| Bawtry | 147·7 |
| *Piper's Wood* (*down*) | 149·5 |
| Rossington | 151·3 |
| *Black Carr Junction* (*up*) | 153·2 |
| DONCASTER | 156·0 |
| Arksey | 158·1 |
| *Shaftholme Junction* (*down*) | 160·2 |
| Moss | 163·0 |
| Balne | 166·0 |
| Heck | 167·3 |
| Templehirst | 169·8 |
| *Brayton Junction* (*up*) | 173·0 |
| SELBY | 174·4 |
| Riccall | 178·5 |
| Escrick | 181·1 |
| Naburn | 184·0 |
| *Chaloner Whin Junction* (*up*) | 186·2 |
| YORK | 188·2 |
| **York—Newcastle.** | |
| YORK | 0·0 |
| *Poppleton Junction* (*up*) | 1·6 |
| Beningbrough | 5·5 |
| Tollerton | 9·7 |
| Alne | 11·2 |
| Raskelf | 13·4 |
| Pilmoor | 16·1 |
| Sessay | 18·0 |
| THIRSK | 22·2 |
| Otterington | 26·6 |
| NORTHALLERTON | 30·0 |
| Danby Wiske | 33·7 |
| Cowton | 37·2 |
| Eryholme (closed) | 38·9 |
| Croft Spa | 41·5 |
| DARLINGTON | 44·1 |
| *Parkgate Junction* (*up*) | 44·8 |
| Aycliffe | 49·5 |
| Bradbury | 54·2 |
| FERRYHILL | 57·0 |
| *Tursdale Junction* (*up*) | 59·0 |
| Croxdale | 61·9 |
| *Relly Mill Junction* (*down*) | 65·1 |
| DURHAM | 66·1 |
| *Newton Hall Junction* | 67·5 |
| Plawsworth | 70·0 |
| Chester-le-Street | 71·9 |
| Birtley | 74·7 |
| Lamesley | 76·3 |
| Low Fell | 77·6 |
| Bensham | 78·9 |
| King Edward Bridge Junction | 79·5 |
| NEWCASTLE-ON-TYNE | 80·1 |
| [Gateshead West | 80·0 |
| Newcastle (*via* High Level Bridge) | 80·6] |
| **Newcastle—Edinburgh.** | |
| NEWCASTLE-ON-TYNE | 0·0 |
| Manors East | 0·6 |
| Heaton | 1·7 |

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| | Miles. | | Miles. |
|---|---|---|---|
| *Benton Bank (up)* | 2·4 | Scremerston | 63·5 |
| Forest Hall | 5·0 | Tweedmouth | 65·7 |
| Killingworth | 5·9 | BERWICK | 66·9 |
| Annitsford | 7·7 | *Marshall Meadows (up)* | 68·6 |
| Cramlington | 9·9 | Burnmouth | 72·4 |
| Plessey | 11·5 | Ayton | 74·1 |
| Stannington | 13·9 | Reston Junction | 78·1 |
| MORPETH | 16·6 | Grant's House | 83·1 |
| Pegswood | 18·5 | Cockburnspath | 87·9 |
| Longhirst | 20·2 | Innerwick | 90·6 |
| Widdrington | 23·2 | *Oxwellmains Siding* | 93·1 |
| Chevington | 25·6 | DUNBAR | 95·1 |
| Acklington | 28·5 | *Beltonford Siding* | 97·4 |
| Warkworth | 31·9 | East Linton | 100·9 |
| ALNMOUTH | 34·8 | East Fortune | 103·4 |
| Longhoughton | 37·5 | DREM | 106·6 |
| Little Mill | 39·4 | LONGNIDDRY JUNCTION | 111·1 |
| Christon Bank | 43·0 | Prestonpans | 114·9 |
| Chathill | 46·0 | Inveresk | 117·9 |
| Newham | 47·1 | New Hailes | 119·7 |
| Lucker | 49·2 | Joppa | 120·7 |
| Belford | 51·6 | PORTOBELLO | 121·4 |
| Smeafield | 54·9 | *Piershill Junction (up)* | 122·6 |
| Beal | 58·6 | *Abbeyhill Junction (up)* | 123·8 |
| Goswick | 60·8 | EDINBURGH (WAVERLEY) | 124·4 |

## THE ROYAL TRAIN AT BALLATER, L.N.E.R.

*Photo.*] [*R. D. Stephen.*

**4-4-0's Nos. 6845 "GEORGE DAVIDSON" AND 6850 "HATTON CASTLE."**

Note Special Head Code, Four White Discs.



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# British Locomotive Practice and Performance.

By CECIL J. ALLEN, M.Inst.T., A.I.Loco.E.

*Photo.*] [*P. Wyand.*

**S.R. 4-4-0 No. E338 (CLASS "H").**

IN presenting some details of current locomotive work in Scotland, as is customary in the first month of the year, I am glad to be in a position to describe several runs which embodied features of a really noteworthy character. Several of these came under my own observation, but for the rest I am indebted, as is usually the case in January, to the kindness of correspondents who have supplied me with copies of their own recorded runs. I propose, in view of the considerable amount of space devoted lately to L.N.E.R. doings, to occupy the major proportion of the present article with journeys over the L.M.S. lines in Scotland.

Let me say here, by way of a preliminary, that the running of express trains in Scotland must not be judged merely by the number of intermediate stops included in their schedules, or the apparently leisurely character of many of their booked speeds from point to point. Owing to the lesser volume of long-distance traffic than that carried over many of the busiest English main lines, there must be comparatively frequent stops in the Scottish schedules, or many intermediate towns would get no train service worth mention, apart from unnecessary and wasteful duplication of trains. And as to gradients, service slacks and other hindrances, only those who are intimately familiar with these routes realise what first-class locomotive performance is often needed to ensure the maintenance even of bare time. One Scottish enthusiast, who has been studying gradient profiles and working times, points out to me that the lately re-timed St. Pancras to Glasgow expresses are only allowed 56 min. for the first 50 miles northwards out of Dumfries, which include a vertical rise of 620 ft. against the engine and a service slack over a colliery pitfall; this compares with the 54 min. allowed the two-hour Birmingham expresses over the same distance out of Euston, negotiating a vertical rise of only 360 ft., the 54 min. of the best Nottingham and Leicester trains of the Midland Division to Bedford, rising 570 ft. *en route*, and the 54 min. of the Great Western down Birmingham trains to Blackthorn, in this case with two severe service slacks and a rise of 515 ft.

Any visitor to Carlisle, again, will note the frequency with which trains which have come south over the 1,015-ft. altitude of Beattock in charge, very likely, of nothing more powerful than a Midland three-cylinder 4-4-0 compound, leave for the 915 ft. of Shap behind two large and powerful 4-6-0 engines. True, the compound has probably not handled more than two thirds of the train's weight up



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the hardest part of the climbing from Glasgow to Beattock—between Uddingston and Craigenhill—but the ascent from Lamington to Beattock Summit, and especially up the final 2¼ miles at 1 in 99, which are steeper than any part of the northern ascent to Shap, is not to be despised. Indeed, I say without hesitation that the Scottish drivers, in general, coax better and harder work out of the Midland compounds than is observable anywhere else on the L.M.S. system.

The stopping of the "Royal Scot" at took assistance up the famous climb from Beattock to Beattock Summit. On one "Royal Scot" trip, not included, with the customary 377-ton winter formation, we certainly did stop at Beattock for help, but the engine appeared to be steaming badly, as on each down-grade we had to run for considerable distances without steam, presumably to give some relief to the boiler. On this occasion No. 6132, *Phœnix*, took 34 min. 40 sec. to Lockerbie and 50 min. 5 sec. to Beattock stop, after which it took us 22 min. 50 sec.

L.M.S. CARLISLE-SYMINGTON.

| Distance. | Engine, 3-cyl. 4-6-0 No. .. .. .. Engine Name.. .. Load (axles) .. .. ,, (tons tare) .. ,, ( ,, full) .. | Schedule. | 6129 *Comet* 46 320 340 | 6127 *Novelty* 50 346 370 | 6128 *Meteor* 52 370 400 | Schedule. | 6130 *Liverpool* 50 377 400 | 6130 *Liverpool* 50 377 400 |
|---|---|---|---|---|---|---|---|---|
| miles. | | min. | m. s. | m. s. | m. s. | min. | m. s. | m. s. |
| 0·0 | Carlisle .. .. | 0 | 0 00 | 0 00 | 0 00 | 0 | 0 00 | 0 00 |
| 4·1 | Rockcliffe .. .. | — | 6 24 | 6 15 | 6 33 | — | 7 05 | 6 25 |
| 8·6 | Gretna .. .. | 11 | 10 47 | 10 40 | 10 56 | 11 | 11 30 | 10 45 |
| 13·0 | Kirkpatrick .. .. | — | 15 54 | 15 55 | 16 19 | — | 16 35 | 15 45 |
| 16·7 | Kirtlebridge .. .. | 21 | 20 26 | 20 35 p.w.s. | 21 13 | 20 | 20 50 | 20 05 |
| 22·7 | Castlemilk Box .. | — | 26 55 | 28 25 | 28 26 | — | 27 00 | 26 25 |
| 25·8 | Lockerbie .. .. | 30 | 29 51 | 31 30 | 31 25 | 29 | 29 55 | 29 20 |
| 34·5 | Wamphray .. .. | — | 38 08 | 39 35 | 39 38 | — | 37 30 | 37 15 |
| 39·7 | Beattock .. .. | 45 | 43 45 | 44 50 | 45 19 | 44 | 42 35 | 42 45 |
| 42·2 | Auchencastle Box .. | — | 47 22 | 48 30 | 49 05 | — | 46 05 | 46 25 |
| 45·3 | Greskine Box .. .. | — | 54 07 | 55 30 | 56 05 | — | 52 40 | 53 20 |
| 47·7 | Harthope Box .. | — | 59 41 | 61 45 | 61 40 | — | 58 30 | 59 05 |
| 49·7 | Summit Box .. .. | 67 | 64 03 | 66 25 | 66 02 | 65 | 63 15 | 63 50 |
| 52·6 | Elvanfoot .. .. | — | 67 33 | 69 50 p.w.s. | 69 08 | — | 66 35 | 67 30 |
| 57·9 | Abington .. .. | — | 72 32 | 75 15 | 73 46 | — | 71 00 | 72 40 |
| 63·2 | Lamington .. .. | — | 77 33 | 80 40 | 78 28 | — | 75 20 | 77 40 |
| 66·9 | Symington .. .. | 84 | 81 44 | 84 10 | 81 59 | 83 | 79 05 | 82 00 |
| 70·0 | Leggatfoot Box .. | — | 85 19 | 87 10 | 85 00 | | | |
| 73·5 | Carstairs .. .. | 92 | 90 02 | 91 10 | 89 13 | | | |

Crewe and Carlisle has put within my reach a few journeys on this famous express, which figure in the first table. With a couple of runs on the "Royal Scot" are given three on the "Midday Scot," and though I have not been fortunate enough to catch one of the 420-ton trains which are regarded as a maximum load for the "Royal Scot" engines north of Carnforth, on three occasions the gross load touched the "400" mark, and for the first time in the whole of my conduct of these articles I am able to present a complete table in which not a single engine

to climb to Summit and 40 min. 10 sec. to Symington, or 91 min. 35 sec. inclusive from Carlisle. Such running was probably exceptional, however; it certainly had no parallel on the other five trips.

In the first column *Comet*, timed by a correspondent, made a good but undistinguished trip, touching 63 m.p.h. at Floriston, mounting the 7½ miles at 1 in 200 past Kirkpatrick at a minimum of 45 and the similar 4¼ miles past Ecclefechan at 51½ an hour, with an intervening maximum of 60 at Kirtlebridge; 69½ an hour was touched at Nethercleugh, and



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1. GLASGOW-LONDON EXPRESS NEAR ABINGTON. COMPOUND -4-0's, NOS. 1142 AND 1145.
2. GLASGOW-LONDON EXPRESS NEAR BEATTOCK. 4-4-0's, NOS. 14312 AND 1148
3. DOWN "ROYAL SCOT" EXPRESS AT SYMINGTON. 4-6-0, NO. 6131 "PLANET."

*Photos. C. J. L. Romanes.*

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the Annan Water was crossed at 61½ an hour. Up the 4 miles at 1 in 202 to Beattock speed fell to 51 m.p.h., and up the 10 miles of the "bank" proper, ranging in steepness between 1 in 69 and 1 in 88, speed was maintained mostly between 25½ and 30 m.p.h. At Summit the train, which had left Carlisle on time, was 3 min. early, and the descent to Carstairs was very leisurely, speed only reaching 66 m.p.h. at Lamington and falling to 45 at Symington, after which there was further easing. Carstairs was reached 2 min. early.

The run made by *Novelty* appeared as a kind of "stop press" in my article of last August, but is now tabulated. We touched 66 m.p.h. at Floriston, and dropped to 45 at Kirkpatrick, but were slowed for p.w. repairs at Kirtlebridge. Then followed speeds of 69 m.p.h. at Nethercleugh, 52½ at Beattock, a gradual fall to 22½ at Harthope and a recovery to 25 at Summit; 66 at Elvanfoot and 67 at Lamington, with a moderate p.w.r. check intervening near Abington; and a much brisker finish into Carstairs than on the previous run, whereby the minimum at Symington was as high as 57 and the maximum at Thankerton 70½ m.p.h. Despite the two checks, there was a gain of ¾-min., and the net time from Carlisle did not exceed 88½ min.

*Meteor*, with 400 tons, left Carlisle 3½ min. late, 2¾ min. of which were recovered to Carstairs. Speeds were 64 m.p.h. at Floriston, 41½ minimum at Kirkpatrick, 56 at Kirtlebridge, 45 at Ecclefechan, 68 at Nethercleugh, and 48½ at Beattock; the ascent to Summit was the best feature of the journey, rivalling, from Greskine upwards, those of the other journeys, with speeds maintained between 25½ and 29½ m.p.h.; then followed a brisker descent than usual of the Clyde Valley, with speeds of 74 m.p.h. at Lamington, 58½ at Symington, 67 at Thankerton, 59 at Leggatfoot and 67 at the troughs. It must not be forgotten that, on these "Midday Scot" runs, the engine concerned has already worked the train over the 141 miles from Crewe, negotiating Shap Summit *en route*, which makes the performance the more meritorious.

But my run with *Liverpool*, shown in the fourth column, leaves the others well in the shade. We had made a poor run from Crewe with *Ajax*, falling to 26 m.p.h. up Grayrigg and to 16 m.p.h. at Shap Summit, and with the help of three p.w.r. checks had reached Carlisle 25 min. late. Here *Liverpool* came on, with Driver Mackay in charge, and although the start to Rockcliffe was singularly modest, it soon became apparent that a first-class effort was to be made. We touched 66 m.p.h. at Floriston, went up Kirkpatrick 1 in 200 at a minimum of 49, reached 64½ at Kirtlebridge, and breasted Ecclefechan bank at 52 an hour. Along the level stretch north of Lockerbie we ran splendidly, with speeds of 72½ m.p.h. at Nethercleugh, 64½ before and 69 after Wamphray, while on passing Beattock we had not fallen below 55. So little had the engine been "winded" by this effort, moreover, that we made the fastest ascent of all four with 370 to 400-ton trains, speed being 37 m.p.h. at Auchencastle, 25 at Greskine, 24 at Harthope and 25 at Summit. The climax was a descent of the Clyde Valley in a style now all too rare on the Caledonian Section; we touched 69 m.p.h. at Elvanfoot, 74 at Crawford, 72½ at Abington and 77½ at Lamington, reaching Symington in a shade over 79 min. from Carlisle. I should have been greatly interested to know how much more time *Liverpool* regained on the far easier schedule from Symington to Glasgow, but unfortunately my destination was Edinburgh; with 4-4-0 No. 14348 and a driver determined to stick most rigorously to his booked time allowance (even though it involved us in running all the way down from Cobbinshaw to Edinburgh at a speed never exceeding 60 m.p.h. and at times dropping even below 50!), we reached Edinburgh 19 min. late.

On the second run with *Liverpool* we left Carlisle on time, which was in some respects unfortunate, as we made a most energetic start. To Wamphray, indeed, the going was the fastest of the series. Speeds were 65 m.p.h. at Floriston, 47½ above Kirkpatrick, 62½ at Kirtlebridge, 50½ above Ecclefechan, 70½ at Nethercleugh, 61½ at Annan Water, 51 at Beattock, 25 at Greskine, and between 24 and 25 from there to Summit, after which, being ahead of time, we took things in a very leisurely fashion down to Symington, reached a minute early.

The up journey runs were made for the

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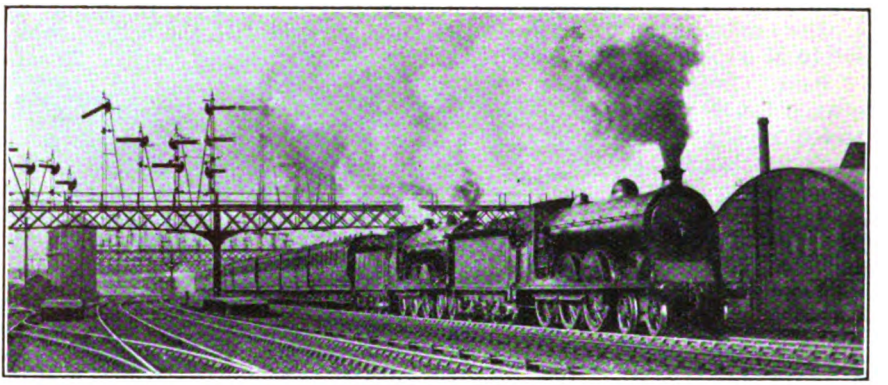

1. **UP WEST COAST EXPRESS LEAVING ABERDEEN. CAL. 4-6-0's NOS. 14754 AND 14753.** *Photo. H. Gordon Tidey.*

2. **GLASGOW-WEMYSS BAY TRAIN PASSING CARDONALD. CAL. 4-6-2T, NO. 15359.** *Photo. P. Ransome Wallis.*

3. **ABERDEEN-GLASGOW EXPRESS LEAVING PERTH. CAL. 4-6-0 NO. 14750.** *Photo. H. Gordon Tidey.*

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most part on the 4.30 p.m. train from Glasgow to Liverpool and Manchester, which is booked to do some smart running between stops. Unfortunately the two "Royal Scot" engines had the lighter trains (both these runs were timed by correspondents), and so were not in the least extended. The runs were correspondingly dull, speeds being 60 and 58½ m.p.h. at Lamington, minima of 49 and 47½ between Crawford and Elvanfoot, maxima of 52 and 52½ beyond that station terribly difficult time for a whole summer allotted to the compound-hauled 9.30 a.m. out of Glasgow—and *Phœnix*, which here appears to have arisen in a regenerated condition from the ashes of the north-bound trip I described previously, in but ¾-min. more, with 40 tons additional trainload.

But most of the lustre in this table belongs to the two compound runs. My correspondent's journey behind No. 1136 was made on the 9.30 a.m.; mine, with

L.M.S. SYMINGTON—CARLISLE.

| Distance. | Engine No. .. .. / ,, Type .. .. / Load (axles) .. .. / ,, (tons tare) .. / ,, ( ,, full) .. | Schedule. | 6131 †4-6-0 42 294 305 | 6132 †4-6-0 46 320 345 | 1136 ¶4-4-0 46 326 345 | 904 ¶4-4-0 48 342 360 | Schedule. | 14674 ‡4-6-0 46 343 365 |
|---|---|---|---|---|---|---|---|---|
| miles. | | min. | m. s. | m. s. | m. s. | m. s. | min. | m. s. |
| 0·0 | Symington .. .. | 0 | 0 00 | 0 00 | 0 00 | 0 00 | 0 | *0 00 |
| 3·6 | Lamington .. .. | — | 5 48 | 6 00 | 6 00 | 6 10 | — | 4 10 |
| 9·0 | Abington .. .. | — | 11 39 | 11 57 | 12 07 | 11 55 | — | 10 30 |
| 11·5 | Crawford .. .. | — | 14 32 | 14 53 | 15 09 | 14 50 | — | 13 50 |
| 14·2 | Elvanfoot .. .. | — | 17 48 | 18 14 | 18 30 | 18 00 | — | 17 15 |
| 17·1 | Summit .. .. | 23 | 21 47 | 22 15 | 22 20 | 21 45 | 22 | 21 40 |
| 27·1 | Beattock .. .. | 35 | 33 17 | 32 39 | §32 58 | 32 20 | 33 | 31 55 |
| 5·2 | Wamphray .. .. | — | 6 53 | 6 54 | 6 50 | 6 45 | — | 37 10 |
| 11·0 | Nethercleugh .. | — | 12 21 | 12 21 | 12 12 | 12 05 | — | 43 30 sigs. |
| 13·9 | Lockerbie .. .. | 16 | 15 40 | 15 47 | 15 41 | 15 15 | 47 | 47 00 |
| 3·1 | Castlemilk Box .. | — | 5 34 | 5 46 | 5 59 | 6 10 | — | 51 50 |
| 9·1 | Kirtlebridge .. .. | 10 | 11 43 | 12 09 | 12 09 p.w.s. | 12 00 | 56 | 57 55 |
| 12·8 | Kirkpatrick .. .. | — | 15 10 | 15 39 | 16 34 | 15 20 | — | 61 35 |
| 17·2 | Gretna.. .. .. | 19 | 19 00 | 19 51 | 20 21 | 19 10 | 65 | 65 30 |
| 21·7 | Rockcliffe .. .. | — | 23 06 | 23 52 | 24 30 | 23 10 | — | 69 35 |
| 23·7 | Kingmoor Box .. | — | 25 07 | 25 48 | 26 36 | 25 00 sigs. | — | 71 30 sigs. |
| 25·8 | Carlisle .. .. | 30 | 28 04 | 28 48 | ‖29 47 | 28 55 | 76 | 75 45 |

* Passing time. ‡ G. & S.W. superheated type. ¶ Three-cylinder compound type.
† "Royal Scot" type. § Schedule, 33 min. ‖ Schedule, 28 min.

and minima of 33 on both runs at Summit, whence moderate descents were made to Beattock, reached respectively 1¾ and 2½ min. inside time. On the short runs on to Lockerbie, both made almost exactly to time, top speeds were 69½ and 65½ m.p.h. at Nethercleugh. Then followed rates of 45½ and 42 m.p.h. at Castlemilk, 65 and 64½ before and 61½ and 62½ after Kirtlebridge, maxima of 72½ and 73 down past Gretna, and 59 and 62 before shutting off steam beyond Kingmoor. *Planet* succeeded in making the run from Lockerbie to Carlisle in 28 min.—the No. 904, was on the 4.30 p.m. The gradients from Lamington are round about 1 in 300 for 7 miles, thence 1 in 240 for a mile to Crawford, and thereafter 1 in 142–152 for 1½ miles; finally, a level 1½ miles to beyond Elvanfoot leads to the 2¼-mile stretch at 1 in 99 to Summit. On the two runs the speeds were 58½ and 60 at Lamington, 51 and 55½ at Abington, 48½ and 47 at the top of the steep pitch beyond Crawford, 52½ and 56½ at Elvanfoot, and 41 and 40—two astonishing achievements—after mounting the 1 in 99 to Summit. Restrained run-

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STRANRAER GOODS TRAIN APPROACHING DUMFRIES, 2-6-0 NO. 17823.

LONDON (ST. PANCRAS)—GLASGOW (ST. ENOCH) EXPRESS LEAVING DUMFRIES, 4-4-0 NO. 1066.

GLASGOW (ST. ENOCH)—CARLISLE TRAIN AT DUMFRIES, 4-6-0 NO. 14659.

*Photographs by C. J. L. Romanes.*

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ning brought the two trains into Beattock in 33 and 32¼ min. from Symington, respectively 2 and 2¾ min. inside time. Fast running followed to Lockerbie, 15¾ and 15¼ min. start-to-stop for the distance of all but 14 miles involving speeds of 64½ to 67½ m.p.h. for most of the distance in both cases. Then came two very smart runs to Carlisle, even though No. 1136 experienced a p.w. check beyond Kirtlebridge. Speeds were 44 and 42 m.p.h. at Castlemilk, 64 and 72½ before Kirtlebridge, 74 and 75 m.p.h. at Gretna, and 64 and 69 at Floriston, after which No. 904 suffered a signal check outside the Citadel Station. But for this, the compound on the latter run would have completed the 25·8 miles from Lockerbie in 28 min. start-to-stop, 360-ton train notwithstanding, and the net time of No. 1136 with 345 tons was not more than 28¾ min. On such times as these No. 904 could without difficulty have brought this load from Symington to Carlisle in 68 or 69 min. for the 66·9 miles—one of the most brilliant Midland compound feats that has ever yet come under my notice.

The run in the last column is of particular interest as showing, in comparison, the running of one of the Glasgow, & South Western 4-6-0 engines—prior to grouping the superheated 4-6-0 No. 129—over the same route with almost exactly the same load. This motive power development results from interworking, arrangements between the two sections whereby Glasgow & South Western drivers are now responsible for certain of the Caledonian main-line turns. The train concerned was the 1.50 from Glasgow, booked non-stop from Strawfrank Junction at Carstairs, where the Edinburgh portion is attached, to Carlisle; and the times were recorded by a correspondent, whose log unfortunately gives no details of the maximum and minimum speeds. The uphill work was inferior to that of the smaller and lighter compounds, but time was being kept throughout, delays notwithstanding, and in the circumstances, doubtless, the 4-6-0 engine was not being extended. Despite passing Symington at speed (in 11 min. 35 sec. from Strawfrank, 6·3 miles), as compared with a dead start, and thereby gaining a couple of minutes, the bigger engine took almost exactly the same time as No. 904 to Summit, and over every pass-to-pass stretch without exception the compound had the better of her 4-6-0 rival. Net time of No. 14674 was about 72½ min. from passing Symington to Carlisle, and about 84 min. from Strawfrank to Carlisle, start-to-stop, against a booking of 86 min.

Leaving for the present the Glasgow-Symington runs, which with their lighter loads were of less interest, we come now to the Glasgow and South Western trips, and here again some exceptional feats, both of hill-climbing and of speed, figure in the tables reproduced. There are first to be described three runs from Carlisle to Kilmarnock, for the timing of which correspondents were in all cases responsible. Compound No. 914, on the 6.28 p.m. express from Carlisle, leaving Carlisle 7¾ min. late, made up 5¼ min. of the arrears on the first brief run to Dumfries alone, though it must be admitted that this is, by a wide margin, the easiest part of the booking between Carlisle and Glasgow. At Floriston speed touched 64 m.p.h., but was reduced to 48 over Gretna Junction. On the easy grades to Annan No. 914 touched 66 an hour, then breasted the 3-mile rise past Ruthwell at a minimum of 56 and touched 68 at Racks.

The start from Dumfries involves very hard locomotive work. After 3 miles of gently rising grades past Holywood, there follow, first 3¾ miles up at 1 in 200, then a level 1¼ miles just below Closeburn, and another mile at 200 past that station, and finally 6 miles rising at 1 in 150 to the mouth of Drumlanrig Tunnel, ¾-mile beyond Carronbridge. A "breather," 4½ miles long, follows past Ardoch cabin, of which 3½ miles are in favour of the engine at between 1 in 200 and 400; then more climbing, at 1 in 180 for 3 miles and 215 for a mile to Sanquhar, and again 3½ miles at 1 in 200 from Kirkconnel. A nice stretch of line, indeed, over which to maintain an average rate of 54 miles an hour! No. 914 was badly slacked beyond Holywood, but averaged 54½ m.p.h. up the 1 in 200 and never went below 52 on the 150; the maximum at Ardoch was 71 m.p.h., and the 1 in 180 to Sanquhar was surmounted at a *minimum* of 60! There was another bad slack before New Cumnock, but between that

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and the usual p.w. slack over the pitfall at Barony Junction a maximum of 73 was touched. Speed rose to 68 an hour in descending to Mauchline, but was reduced to 50 over Ballochmyle Viaduct; finally there came maxima of 77 and 72 down the 1 in 100 from Garrochburn, broken intermediately by a slack to 60 round Wood-4-6-0 No. 129, now No. 14674—the only one of this type which ever appeared to me to be capable of really satisfactory running; it has always been somewhat of a mystery, indeed, why no attempt was ever made to superheat further engines of the class, but there was probably some structural objection. The load was 60 tons

L M S CARLISLE–KILMARNOCK.

| Distance. | Engine No. .. .. / Load (axles) .. .. / ,, (tons tare) .. .. / ,, ( ,, full) .. .. | Schedule. | *914 / 28 / 201 / 215 | ‡14674 / 34 / 259 / 275 | Schedule. | *1065 / — / 294 / 315 | Schedule. | Distance. | *1068 / †42 / †277 / †295 |
|---|---|---|---|---|---|---|---|---|---|
| miles. | | min. | m. s. | m. s. | min. | m. s. | min. | miles. | m. s. |
| 0·0 | Carlisle .. .. .. | 0 | 0 00 | 0 00 | 0 | 0 00 | 25 | 17·6 | 31 05 |
| 4·1 | Rockcliffe .. .. .. | — | 6 05 | 8 00 | — | — | — | 10·5 | 18 20 |
| | | | | sigs. | | | | | sig. |
| 8·6 | Gretna .. .. .. | 12 | 10 30 | 12 50 | 12 | 11 30 | 13 | 6·0 | stop. 13 00 |
| 11·7 | Rigg .. .. .. | — | 13 55 | 16 15 | — | — | — | 5·9 | 9 15 |
| 14·6 | Eastriggs .. .. .. | — | 16 40 | 18 55 | — | — | — | 3·0 | 5 45 |
| 17·6 | Annan .. .. .. | 22 | 19 30 | 21 40 | §23 | 21 30 | 20 | 15·5 | 20 25 |
| 21·0 | Cummertrees .. .. | — | 22 50 | 24 40 | — | — | — | 12·1 | 16 00 |
| 24·6 | Ruthwell .. .. .. | — | 26 20 | 28 00 | — | — | — | 8·5 | 12 35 |
| 29·2 | Racks .. .. .. | — | 31 00 | 32 20 | — | — | — | 3·9 | 7 00 |
| | | | | sig.stop | | | | | |
| 33·1 | Dumfries .. .. .. | 41 | 35 50 | 42 00 | 43 | 20 15 | 71 | 58·1 | 69 25 |
| | | | | | | | | | sigs. |
| 3·4 | Holywood .. .. .. | — | 6 05 | 5 40 | — | 6 10 | — | 54·7 | 64 05 |
| | | | p.w.s. | p.w.s. | | | | | |
| 7·6 | Auldgirth .. .. .. | — | 11 55 | 10 55 | — | 11 20 | — | 50·5 | 60 30 |
| 11·5 | Closeburn .. .. .. | — | 16 10 | 15 40 | — | — | — | 46·6 | 56 55 |
| 14·2 | Thornhill .. .. .. | 17 | 19 10 | 19 05 | 17 | 20 05 | 56 | 43·9 | 54 30 |
| 17·5 | Carronbridge .. .. | — | 22 57 | 23 30 | — | 24 30 | — | 40·6 | 51 00 |
| | | | | | | | | | p.w.s. |
| 26·1 | Sanquhar .. .. .. | 32 | 31 20 | 32 30 | 32 | 34 30 | 43 | 32·0 | 40 45 |
| 29·5 | Kirkconnel .. .. | — | 34 50 | 36 00 | — | 38 00 | — | 28·6 | 37 40 |
| | | | p.w.s. | | | | | | |
| 36·9 | New Cumnock .. .. | 45 | 44 50 | 43 35 | 45 | 46 35 | 32 | 21·2 | 30 25 |
| 42·3 | Old Cumnock .. .. | — | 50 07 | 48 25 | — | 52 15 | — | 15·8 | 23 40 |
| | | | p.w.s. | p.w.s. | | p.w.s. | | | |
| 44·3 | Auchinleck .. .. | — | 52 30 | 50 20 | — | 54 40 | — | 13·8 | 20 55 |
| 48·7 | Mauchline .. .. .. | 56 | 56 50 | 54 05 | 57 | 59 50 | 15 | 9·4 | 15 25 |
| 51·3 | Garrochburn Box .. .. | — | — | 56 30 | — | — | — | 6·8 | 11 25 |
| 56·3 | Hurlford .. .. .. | — | 63 33 | 60 30 | — | 67 20 | — | 1·8 | 3 35 |
| 58·1 | Kilmarnock .. .. | 68 | 65 45 | 62 50 | 69 | 69 45 | 0 | 0·0 | 0 00 |

* 3-cylinder 4-4-0 compound.

‡ Superheated G. & S.W. 4-6-0 type.

† 56 axles = 357/380 tons, Dumfries, to Carlisle.

§ Includes allowance for conditional stop.

head curve. Net time for the 58·1 miles from Dumfries over New Cumnock Summit to Kilmarnock was thus 62¼ min.—a gross gain of 11 min. to engine from Carlisle—no allowance being made for the pitfall check at Auchinleck, which the schedule claims to cover.

Next appears the re-grouping superheated Glasgow and South Western above that of the previous trip, and the start from Carlisle was 7¼ min. late. A bad signal check occurred no further out than Kingmoor, while outside Dumfries there was a dead stand of 3 min.; despite both, only a single minute was lost on this first stage. Intermediately, the best speeds were 64 m.p.h. at Annan and 71 at Racks; net time from Carlisle

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to Dumfries was not more than 35 min. for the 33·1 miles, or 6 min. inside schedule. Out of Dumfries the same p.w. caution as on the last run was experienced at Auldgirth, after which the speed maintained on the 1 in 200 was between 48 and 49 m.p.h. and on the 1 in 150 45 m.p.h. Top speed at Ardoch was 64 m.p.h., followed by minima of 55 on both the 1 in 180 to Sandquhar and the 1 in 200 from Kirkconnel. Finally a maximum rate of 74 an hour was reached before Mauchline, and 77 was sustained for some distance after Garrochburn. The actual gain from Dumfries to Kilmarnock in this case was 5¼ min.; the net time was 62 min. and the net gain 6 min., again giving 11 min. to the credit of the engine from Carlisle to Kilmarnock.

The third run was not so spectacular, but 315 tons is a heavy load for one of the compounds on such timings as these. The particulars in this log are somewhat scanty, but it mentions that the maximum rate at Floriston was 63 m.p.h.; 45 was the minimum up the 1 in 200 past Ruthwell, and 63 the maximum at Racks; 52 m.p.h. was attained at Auldgirth, and the lowest rate up the 150 at Carronbridge was 44½ m.p.h.; the 1 in 180 to Sanquhar was productive of a drop to 51½, and the 1 in 200 from Kirkconnel to 52; and not over 65½ was the highest speed in descending to Hurlford. The only check experienced was the pitfall slack at Auchinleck, for which allowance cannot be made, so that the ¾ min. late arrival at Kilmarnock must go against the engine. It might easily have been avoided by more energetic travelling over the falling grades at the conclusion of the run, comparable to the speeds on the two preceding trips.

Of the speeds on the southbound journey which figures last in the table, no notes are given, save that the minimum up the 4¼ miles at 1 in 100 to Mossgiel Tunnel was 31 m.p.h.—a good figure with 295 tons of train—and the maximum down to Dumfries was 72. Net time from Kilmarnock to Dumfries was about 67 min. The train there was made up to the formidable figure of 380 tons (57 axles), and the engine lost ½ min. to Annan, but would have run on to Carlisle in 23 min., start-to-stop—2 min. inside schedule—but for a series of signal checks and stops beyond Rockcliffe.

A couple of runs between Kilmarnock and Glasgow now follow. The Corkerhill driver, continuing his triumphant progress with No. 14674 on the 6.28 p.m. from Carlisle, and with load now slightly reduced to 265 tons, passed Kilmaurs, 2·2 miles, in 4 min. 35 sec., Stewarton, 5·5 miles, in 10 min. 5 sec., and Dunlop, 7·7 miles, in 13 min. 55 sec.; from Kilmarnock the line ascends to Kilmaurs at 1 in 180, thence for 1½ miles at 87 and 1¼ at 152, and finally for 2 miles at 1 in 75, on which speed fell to 30 m.p.h. The usual modest downhill speeds followed, Lugton, 10 miles, being passed in 16 min. 35 sec., Barrhead, 16·8 miles, in 24 min., and Busby Junction, 20·5 miles, in 27 min. 25 sec.; Strathbungo, 22·4 miles, was reached in 29 min. 50 sec., and, after a 25 sec. stop, St. Enoch, 24·4 miles, in 35 min. 5 sec.—a further gain of 3 min. on schedule. It is of interest to note that on this run the driver used full regulator for all the hard work, with 20 per cent. cut-off from Holywood to Auldgirth, 25 up the 1 in 200 to Thornhill and 30 up the succeeding 150 to Drumlanrig Tunnel; then 20 per cent. all the way to Kilmarnock, with the regulator opening varied as required. Up the 1 in 75 from Stewarton, 30 per cent. and full regulator sufficed. Up to Drumlanrig compound No. 914, maintaining 52 an hour on 1 in 150 with 215 tons, was working in the fifth notch forward from centre, corresponding to about 30 per cent. in the case of an ordinary simple engine.

The final run was on the 5.30 p.m. from St. Enoch to Kilmarnock, on which compound No. 1068, with a Kingmoor driver in charge, had a 30-axle train of 210 tons. As far as Nitshill, the grades are but gradually against the engine; Strathbungo, 1·9 miles, was passed in 3 min. 45 sec., and Nitshill, 5·9 miles, in 8 min. 10 sec., speed having just touched the "sixty" line at Kennishead. Then follows a mile up at 1 in 100 to Barrhead, and 3½ miles at between 1 in 67 and 70 past Neilston, on which the engine actually maintained 37½ m.p.h.—an astonishing feat indeed. Barrhead, 7·6 miles, was passed in 9 min. 50 sec., Neilston, 9·7 miles, in 12 min. 35 sec.,

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1. UP SUNDAY "FLYING SCOTSMAN," NEAR DREM. 4-6-2 NO. 2547 "DONCASTER." *Photo. C. J. L. Romanes.*

2. UP EXPRESS NEAR CRAIGENTINNY. 4-6-2 NO. 2401 "CITY OF KINGSTON-UPON-HULL." *Photo. P. Ransome Wallis.*

3. UP SUNDAY EXPRESS NEAR DREM. 4-6-2 NO. 2568. *Photo. P. Ransome Wallis.*

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Caldwell, 12·7 miles, in 16 min. 50 sec., and Lugton, 14·4 miles, in 18 min. 45 sec., 4¼ min. early. One wonders if such times as these have ever been surpassed here with a corresponding load. Very restrained running followed down to Kilmarnock, which was reached in 30 min. 40 sec., 3¼ min. early.

Now I must pass on hastily to the London and North Eastern system. A couple of runs between Edinburgh and Glasgow produced some heavy loads, but I was disappointed not to enjoy the services of one of the new "Shire" class engines. No. 6388, *Colonel Craigengelt*, horsed the "Queen of Scots" express out of Edinburgh, with a gross weight of 330 tons, and made a featureless run. Gogar, 5·5 miles, was passed in 9¾ min; Winchburgh Junction, 12·6 miles, in 18¼ min.; Linlithgow, 17·6 miles, in 23 min. 35 sec. —speed here rose to 64½ m.p.h.—and Polmont, 22·3 miles, in 28¼ min.; Falkirk, 25·5 miles, being reached in 32 min. 35 sec. A stop of 40 sec. sufficed, after which we passed Castlecary, 6·3 miles, in 9 min. 25 sec., slowed to 45 an hour through Dullatur, cleared Lenzie, 15·5 miles, in 18 min. 55 sec., at 61¾ m.p.h., and Cowlairs, 20·3 miles, in 24 min. 40 sec., after which the usual extremely careful descent of Cowlairs bank brought us into Queen Street, 21·8 miles, in 29 min. 10 sec. We had completed the journey from Edinburgh in 62 min. 25 sec., or ½ min. less than schedule.

On the return journey with the 9.45 p.m. "sleeper," No. 6389, *Colonel Gardiner* —another 4-4-0 "Director"—had an 11-coach train, weighing as much as 358 tons empty and 375 tons full, which was a really substantial proposition. Banked in rear up the 1 in 42 to Cowlairs, we passed that station, 1·5 miles, in 6¾ min., Lenzie, 6·3 miles, in 13 min. 55 sec., at 53½ m.p.h., Croy, 11·5 miles, in 19 min. 35 sec., at 56½, Castlecary, 15·5 miles, in 23¾ min., at 62½, and Falkirk, 21·8 miles, in 29¾ min., at 64½ m.p.h.—excellent going, with such a train. A severe signal check before Polmont preceded the making there of the conditional stop, reached in 35 min. 10 sec. from Glasgow (25 miles), or not more than 33½ min. net. From Polmont we did not do quite so well, passing Linlithgow, 4·7 miles, in 7 min. 50 sec., Winchburgh Junction, 10·3 miles, in 13 min. 40 sec., Gogar, 16·8 miles, in 20 min. 50 sec., at 61 m.p.h., and Haymarket, 21·1 miles, in 25¼ min., and reaching Waverley, after a check in Princes Street Gardens, 22·3 miles, in 28½ min., or 28 min. net. From Glasgow we had taken 64 min. 35 sec., or 62½ min. net, in place of the 65 min. allowed when the Polmont stop is made.

For three runs between Edinburgh and Carlisle I am indebted to correspondents; the south-bound run made by the 4-4-2 engine *Teribus* is the best, with a load slightly in excess of the maximum of 290 tons allowed unpiloted, that I have ever seen recorded over this route. Both runs were made on the 10·5 a.m. express, during the height of the summer, when a relieving train at 10.10 a.m. takes the Kelso portion. Tabular details of the times are given, and it only remains to add a note of the speeds. *Holyrood*, with a load 25 tons short of the maximum tare of 290 tons allowed unpiloted over this route, did not appear to have much in reserve. Speed touched 57 m.p.h. at Portobello, and on the rising grades from Niddrie South Junction to Hardengreen Junction (averaging 1 in 200) maintained 51½ an hour. Then followed the toilsome 8½ miles up at 1 in 70 to Falahill, on which speed ruled at between 25 and 30 m.p.h.; after the summit, the descent was more leisurely than the time-table allows, and 1½ min. were dropped to Galashiels; net time was 51½ min. On the 10½ miles from Hawick start to Whitrope Summit, varying in steepness chiefly between 1 in 75 and 117, speed ranged from 34½ m.p.h. on the flatter stretches to 25½ on the steeper, and the loss to the top was only ½-min. Very cautious running followed on the descent to Newcastleton, and after that no higher speed than 64 m.p.h. occurred, but the engine had a minute in hand at Canal Junction, and the net time from Hawick to Carlisle was about 64½ min.

I am a little doubtful of certain of the speeds recorded in my other correspondent's log; I should imagine that he was estimating from the rail-joints, and mistook for 30-ft. lengths some of the old North British 36-ft. rails. The performance of *Teribus* with slightly over the maximum permissible tare was excellent. Over a minute was gained from Edinburgh

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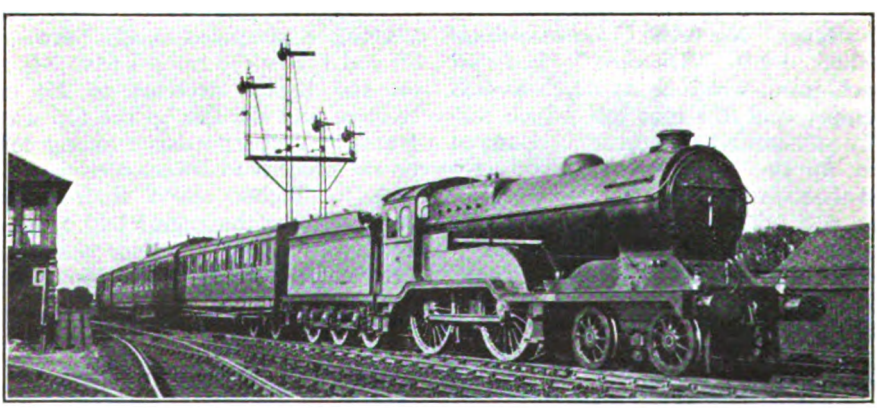

1. WHITLEY BAY EXCURSION AT DUNS (N.B. SECTION). N.B.4-4-0's NOS. 9287, "GLEN GYLE," AND 9504, "GLEN ALLADALE." *Photo. C. J L. Romanes.*

2. PERTH-EDINBURGH LOCAL TRAIN NEAR GLENFARG. 4-4-0 NO. 250, "PERTHSHIRE." *Photo. R. D Stephen.*

3. THORNTON-GLASGOW TRAIN SHUNTING AT DALMENY. 4-4-0 NO. 6397 "THE LADY OF THE LAKE." *Photo. R. D Stephen.*

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up to Falahill, with maintained speeds of between 26½ and 29½ m.p.h. on the 1 in 70; and a brisk descent to Galashiels resulted in a gain of 2¼ min. By Hawick, the aggregate gains to engine amounted to 4 min. net, and then a fine climb followed to Whitrope, speed averaging but little below 30 an hour all the way up; smart running was made from there to Carlisle, the 27·2 miles from Steele Road to Canal Junction taking 27 min. 35 sec. only. From Hawick to Carlisle, a further 4 min. were thus gained, making a total of 8 min. to engine on the journey—in the circumstances a fine achievement.

The magnitude of the load on the return journey, by the night express, was such, of course, as to demand a pilot; it is for the handling of trains of this weight unassisted that the "Pacifics" are to be brought into use before long over this section. The two engines between them had a tolerably easy task, and gained in all 5¾ min. Minimum speeds were 36 m.p.h. up the 3½ miles at 1 in 100 to Penton, 26½ on the 8 miles at 1 in 75 to Riccarton Junction, and a recovery to 30 on the succeeding 1 in 80–96 to Whitrope; on the long climb to Falahill, 41 was attained on the 1 in 99–155–110 to Bowland, 46½ on the 175 to Stow, 52½ on the 200–150 to Fountainhall, while the final 150–100–132 to Falahill brought the rate down to 40 an hour, 3½ min. being

L.N.E.R. EDINBURGH—CARLISLE.

| Distance. | Engine, 4-4-2 No. .. .. / ,, Name .. .. / Load (tons tare) .. .. / ,, ( ,, full) .. .. | Schedule. | 9904 *Holyrood* 265 285 | 9906 *Teribus* 293 315 | Distance. | Schedule. | *9876 *Waverley* †405 †430 |
|---|---|---|---|---|---|---|---|
| miles. | | min. | m. s. | m. s. | miles. | min. | m. s. |
| 0·0 | Edinburgh .. .. .. | 0 | 0 00 | 0 00 | 33·5 | 49 | 45 15 |
| 3·0 | Portobello .. .. .. | 6 | 4 40 | 4 15 | 30·5 | 43 | 40 00 |
| | | | p.w.s. | | | | |
| 4·3 | Niddrie Jc. .. .. .. | 8 | 7 25 | 6 00 | 29·2 | 41 | 38 25 |
| 8·3 | Hardengreen Jc. .. .. | 13 | 13 00 | 10 50 | 25·2 | 37 | 33 45 |
| 12·0 | Gorebridge .. .. .. | — | 19 50 | 18 20 | 21·5 | — | 29 35 |
| 16·0 | Tynehead .. .. .. | — | 29 20 | 27 35 | 17·5 | — | 24 50 |
| 18·0 | Falahill Box .. .. .. | 33 | 33 55 | 31 50 | 15·5 | 26 | 22 30 |
| 22·6 | Fountainhall .. .. .. | — | 39 45 | 37 05 | 10·9 | — | 16 20 |
| 26·7 | Stow .. .. .. .. | — | 44 25 | 40 50 | 6·8 | — | 11 25 |
| 29·8 | Bowland .. .. .. | — | 48 00 | 44 20 | 3·7 | — | 7 25 |
| 33·5 | Galashiels .. .. .. | 51 | 52 35 | 48 50 | 7·0 | 11 | 10 30 |
| 3·7 | Melrose .. .. .. | 6 | 5 30 | 5 45 | 3·3 | — | 5 40 |
| 3·3 | St. Boswell's .. .. .. | 7 | 6 15 | 6 15 | 12·3 | 17 | 16 45 |
| | | | | p.w.s. | | | |
| 4·6 | Belses .. .. .. .. | — | 7 25 | 9 00 | 7·7 | — | 11 35 |
| 8·0 | Hassendean .. .. .. | — | 11 45 | — | 4·3 | — | 7 40 |
| 12·3 | Hawick .. .. .. | 17 | 16 40 | 17 45 | 45·4 | 68 | 66 00 |
| 3·9 | Stobs .. .. .. .. | — | 10 10 | 8 50 | 41·5 | — | 59 55 |
| 7·0 | Shankend .. .. .. | — | 16 55 | 14 55 | 38·4 | — | 56 40 |
| 10·9 | Whitrope .. .. .. | 25 | 25 30 | 23 30 | 34·5 | 54 | 51 50 |
| 13·0 | Riccarton Jc. .. .. .. | 28 | 28 30 | 26 35 | 32·4 | 49 | 47 05 |
| 16·6 | Steele Road .. .. .. | — | 32 55 | 30 40 | 28·8 | — | 39 15 |
| 21·1 | Newcastleton .. .. .. | 37 | 37 40 | 35 10 | 24·3 | 31 | 31 40 |
| 24·2 | Kershopefoot .. .. .. | — | 40 50 | 38 20 | 21·2 | — | 28 10 |
| 28·7 | Penton .. .. .. .. | — | 45 45 | 43 15 | 16·7 | — | 22 20 |
| 31·3 | Riddings Jc. .. .. .. | — | 48 30 | 45 45 | 14·1 | — | 18 30 |
| 35·8 | Longtown Jc. .. .. .. | 53 | 53 15 | 50 30 | 9·6 | 13 | 13 30 |
| 41·0 | Harker .. .. .. .. | — | 58 20 | 55 35 | 4·4 | — | 8 10 |
| 43·8 | Canal Jc. .. .. .. | 62 | 61 00 | 58 15 | 1·6 | 4 | — |
| | | | sigs. | | | | |
| 45·4 | Carlisle .. .. .. .. | 66 | 65 25 | 62 00 | 0·0 | 0 | 0 00 |

* Piloted by 4-4-0 No. 9360, *Guy Mannering*. † 381/405 tons St. Boswell's to Edinburgh.

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1. ABERDEEN-BALLATER TRAIN LEAVING ABERDEEN. 4-4-0 NO. 6872. *Photo. H. Gordon Tidey.*

2. UP GOODS TRAIN NEAR KITTYBREWSTER. 4-4-0 NO. 6850, "HATTON CASTLE." *Photo. P. Ransome Wallace.*

3. DOWN INVERNESS TRAIN AT ABERDEEN. 4-4-0's NOS. 6908 AND 6848, "ANDREW BAIN." *Photo. H. Gordon Tidey.*

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gained in this ascent alone. Downhill speeds were, as always on these winding sections, very restrained, not exceeding a momentary 67 down from Whitrope and 63½ down from Falahill.

Last of all I have to mention a remarkable trip which I was fortunate enough to enjoy on the up "Flying Scotsman," a few days after the abandonment of the non-stop working. To my disappointment, on joining at Edinburgh the up express, which was made up to a total tare weight of 416 tons, and a full weight of 440 tons, it was not to find a "Pacific" at the head, but two 3-cylinder "Z" class "Atlantics"—Nos. 736 and 2201. We had not travelled far, however, before the two engines began to show their mettle. Crossing over at Abbeyhill Junction, and slacking severely for the purpose, caused us to take 5 min. 50 sec. to Portobello, 3 miles, but at Inveresk we were doing 57 m.p.h., and then mounted to Prestonpans at a minimum of 53 (the gradients appear elsewhere in this issue and need no further mention), and reached 66 past Drem; Longniddry, 13·3 miles, was passed in 17½ min., and Drem, 17·8 miles, in 22 min. 5 sec. At East Linton there was a bad slowing for bridge renewal, but at Dunbar (29·3 miles, passed in 34½ min.) we were again doing 61½ m.p.h. Cockburnspath bank brought us down to 32½ m.p.h., and Grant's House Summit, 41·3 miles, was breasted in 50 min. 10 sec., 2¾ min. early. Despite very easy running down to Berwick, further hampered by a severe p.w.r. check at Burnmouth, we were through the Border town, 57·5 miles, in 70 min. 20 sec., the working time, which then included 2 min. for a conditional stop there, allowing 73 min. Immediately afterwards we were brought to a dead stand at Tweedmouth on account of a wagon off the down line at Goswick; this lasted 9 min., and another similar stop at Scremerston lasted 2 min. 20 sec.

We left Scremerston 91 min. 20 sec. after the Edinburgh departure, having by the four delays lost 23 min. From Scremerston we passed Beal, 4·9 miles, in 6¾ min., at 61½ m.p.h.; Belford, 11·9 miles, in 14 min., at 53 m.p.h.; Chathill, 17·5 miles, in 19 min. 40 sec., at 65 m.p.h.; Little Mill, 24·1 miles, in 26¾ min. (having fallen to 46½ m.p.h. up Christon Bank); Alnmouth, 29·3 miles, in 31 min. 10 sec (slowing from 67 to 60 m.p.h. for the curve); Ackington, 35·6 miles, in 37¾ min. at 65 m.p.h.; Chevington, 38·5 miles, in 40¾ min., at 57½ m.p.h.; Longhirst, 43·3 miles, in 46½ min., at 62½ m.p.h.; Morpeth, 46·9 miles, in 50 min. 35 sec., at a reduced speed of 30 m.p.h. for the curve; Plessey, 52·0 miles, in 56 min. 55 sec., at 58½ m.p.h.; Annitsford, 55·8 miles, in 60¾ min., at 65 m.p.h.; Forest Hall, 58·5 miles, in 63½ min., at 57½ m.p.h.; and Benton Bank Box, 61·1 miles, in 65¾ min., at 65 m.p.h. The usual slow running ensued round the curves into Newcastle, and we stopped in the Central station, 63·5 miles from Scremerston, in 69 min. 55 sec., only 8¼ min. late. The total time taken from Edinburgh had been 161¼ min., instead of the 153 min. allowed, but the net time was not more than 138 min. Even allowing for a possible 2-min. stop at Berwick, the two engines had gained at least 10 or 11 min. on schedule. To complete the tale, at Newcastle the "Atlantics" were replaced by "Pacific" No. 4472 *Flying Scotsman*, with Albert Pibworth at the regulator, and by running the 36 miles to Darlington in 46 min. 10 sec., instead of the scheduled 51 min., he straightway cut another 5 min. from booked time, bringing us into Darlington only 3 min. late! Here I had to leave the train, but I should not be surprised if on arrival at York the whole 23 min. of arrears had been recovered. This was quite an exciting trip.

Acknowledgment is due, in conclusion, to E. J. Davey, G. N. Martin, C. G. Woodnut, A. Peacock, R. Dyson, B. D. Sullock, G. Pember, J. Morley, H. J. J. Griffith, J. A. B. Hamilton, "Evandhu," A. P. le M. Sinkinson, A. C. Hawkins, J. B. Aird, L. J. Slatter, G. A. Bamlet, W. K. Nash, G. H. Young, F. R. Hebron, E. W. Maybank, R. E. Mills, L. C. Cross, "H. B.," R. Haigh and C. Wilkinson, all of whom have forwarded letters during the past month.

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RAILWAY MAGAZINE *readers desiring information should mark envelopes "Query" in the upper left-hand corner, and address them to the Editor. Questions relating to the dimensions and weights of railway rolling-stock and to names, numbers, dates, &c., of locomotives should not be forwarded. No reader should send more than two questions in one month. Correspondents are requested to write on one side of the paper only, and although they must give their names and addresses, pen-names or initials may be inserted for Editorial use. Before asking for information concerning railway history or "grouping," the pages of the "Railway Year Book" (5s. net) should be consulted. The thirty-first Annual Edition (1928) of this standard railway reference work is now published. All previous Editions are out of print.*

**Rebuilt Claughton Engines, L.M.S.R.**

Mr. C. Williams advises us that five of these engines are fitted with Caprotti valve gear, Nos. 5927, 5948, 5957, 6023, and 6029. The heating surface of the boilers fitted to these engines has been correctly stated, and the fact that in this respect they appear to be smaller than the boilers originally fitted may be explained by a different size of tube and of varying number. It must be remembered that mere heating surface figures may count for comparatively little. The test is efficiency, and it is sometimes found that a fewer number of tubes gives better results, while if a different size is employed the figures resulting may not appear to be in agreement with increased boiler dimensions in other respects. The braking of bogie wheels is a matter which is decided by each Chief Mechanical Engineer according to his own ideas or may be governed by special considerations.

[Reply to C. R. PRESCOTT and others.]

**G.W.R. Locomotives.**

Mr. F. W. Brewer writes:—"The number of the 0-6-4 tank engine broken up in 1927, given by the writer of the article as 1346, is correct. The Alexandra (Newport and South Wales) Docks and Railway Company purchased three of the Mersey Railway 0-6-4T's and numbered them 22, 23, and 24. When this Welsh concern was absorbed by the G.W.R. in 1922–23, the latter company re-numbered the three engines in question 1344, 1345, and 1346. The Monmouthshire Railway and Canal Company was taken over by the G.W.R. on August 1, 1880. Its engines were re-numbered in the 1300's, but the writer has no knowledge of the present number of the engine (originally No. 43 of the Monmouthshire Railway and Canal Company) mentioned by Mr. O'Connor, and stated by him to be still in service."

[Reply to "R. W. O'CONNOR."]

**"Hook of Holland Continental," L.N.E.R.**

On its revised timing, leaving Liverpool Street at 8.15 p.m., this express is booked to pass Stratford at 8.24, Chadwell Heath at 8.31, Shenfield at 8.45, Chelmsford at 8.56, Witham at 9.6, Colchester at 9.20, and Manningtree at 9.30, reaching Parkeston Quay at 9.42 p.m.

[Reply to "LIVERPOOL STREET."]

**Locomotive Renumbering.**

As occasion offers, we hope to give a good deal of information in this connection, though we do not see our way to devote to this purpose the many pages which would be necessary to give these



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particulars on a complete basis. To a substantial extent, we have already given particulars of named engines, so far as that practice is still adopted.

[Reply to "CRYSTAL PALACE."]

**Great Central Manchester Services.**

The fastest time ever in operation over the Great Central route between Marylebone and Sheffield was 2 hr. 50 min. for the 164¾ miles, by what is now the 3.20 p.m. express from Marylebone to Manchester, communication to Leicester and Nottingham being made by a slip coach at the former station. Owing chiefly to restricted speed through the colliery area north of Nottingham, however, this time was shortly eased out to 2 hr. 57 min., at which it remained until the war period alterations compelled the inclusion of stops at Leicester and Nottingham, which have not since been removed. We have not by us details as to the exact duration of the 3 hr. 50 min. London-Manchester time by this route, but it was not for more than two years.

[Reply to A. S. WELCH.]

**The "Royal Highlander," L.M.S.**

When this train is run in three parts during the height of the summer season at 7.20 and 7.30 p.m. for Crewe, Perth and beyond only, and at 7.40 p.m. making the usual stops of the winter 7.30 p.m. down, the first portion is normally for Aviemore and Inverness, the second for Inverness by both the Carr Bridge and Forres routes, and for Aberdeen, and the third for Oban, Highland line and Aberdeen line intermediate stations. Oban passengers do not, therefore, wait at Crewe as you suggest. The division of the "Royal Highlander" into these three parts is necessary in consequence of the volume of traffic carried.

[Reply to "EMMA."]

**Gradients, Highland Division, L.M.S.**

Ruling gradient from Blair Atholl to Drumochter Summit is 1 in 70, and that gradient is practically continuous for 9½ miles above Struan; from Drumochter to Dalwhinnie the line falls at 1 in 80, and from there to Newtonmore the ruling grade is 1 in 95, there being 5 miles down at 1 in 95-100. From Aviemore to Slochd Mhuic Summit, 1 in 60 (continuous for 2¼ miles above Carr Bridge) is the worst grade, and similarly down to Inverness the line falls from Slochd for 3 miles at 1 in 60, and from between Moy and Daviot to near Inverness there are 12 miles falling, 8 at 1 in 60 and 2½ at 1 in 70. This last is considerably the worst bank between Perth and Inverness.

[Reply to "HIGHLANDMAN."]

**Caprotti-Valve "Claughton" Class Engines, L.M.S.**

The majority of these engines have the normal arrangement of cranks adopted in four-cylinder locomotives (dividing the circle into four parts), so that there are four crank impulses and four exhausts per revolution of the driving wheels; but we believe that at least one of these locomotives has the same crank setting as the Southern "Lord Nelson" type, with eight impulses per revolution. The purpose of the Caprotti and similar gears of the poppet-valve type is to permit of short cut-off working with full open regulators, without the disadvantages attaching to the use of short cut-offs with ordinary valve motions.

[Reply to E. BURY and "ROSSMORE."]

**G.W.R. 4-6-0 Locomotives.**

Mr. F. W. Brewer writes:—"Your correspondent is in error in referring to *Ernest Cunard* as a 2-6-0 engine; also in stating that the old number of the engine bearing that name was 198. Further, none of the 2-6-0's (so far as the writer knows) ever had names. The engine now named *Ernest Cunard* is a two-cylinder 4-6-0, No. 2998. Before the re-numbering took place on December 28, 1912, this engine was No. 98. Its former name was *Vanguard*, which it carried for about a year in 1907. Some G.W.R. passenger engine may have been named 'Persimmon,' but the writer is unable to trace it."

[Reply to "PERSIMMON."]

**Overhauling Locomotives.**

No definite answer can be given, seeing that some engines cover a big mileage in a comparatively short period; some are

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regularly or frequently double or even triple crewed, and a good deal depends on the nature of the work done. It may be said that every engine receives a substantial overhaul at the end of about 12 months or, at most, two years, while there is a fairly complete overhaul after so many miles—10,000, 20,000 or 30,000, as the case may be—have been covered. In from five to seven years it may be necessary to supply a new boiler and renew certain elements, while in 14 or 16 years complete rebuilding may be undertaken.

[Reply to "CITY OF TRURO."]

**Working Times, Pontypool Road to Taunton.**

The 1.38 p.m. from Pontypool Road is booked to pass Maindee Junction North, 9·1 miles, 1.52 p.m.; Maindee East, 9·6 miles, 1.53 p.m.; Severn Tunnel Junction, 18·8 miles, 2.4 p.m.; arrive Stapleton Road, 33·6 miles, 2.30 p.m., and depart 2.32 p.m.; arrive Bristol, Temple Meads, 35·3 miles, 2.37 p.m. Leaving Bristol at 2.53 p.m., Yatton, 12 miles, is passed at 3.9; Uphill Junction, 19·7 miles, at 3.19; Highbridge, 26·9 miles, at 3.25; Cogload Junction, 39·8 miles, at 3.29; and Taunton, 44·8 miles, is reached at 3.45 p.m.

[Reply to "REFUGE."]

**"Reduce Speed" Signs.**

The fish-tailed green "warning" sign is provided to enable drivers to reduce speed well in advance of the point at which track repairs are being carried out, so that speed may be down to the prescribed figure when the train reaches the "C" indicating the commencement of the operations. We agree that it is most undesirable the brakes should be applied so late that their dragging effect is still felt when the train is actually on the section under repair, and it would seem that in the case you cite the regulations were not being properly observed.

[Reply to G. F. RAYNER.]

**Hull and Barnsley War Locomotives.**

Commenting on a query in the October number, and supplementing remarks previously given, "Mogul," writing from Hull, explains that the crest carried by Hull and Barnsley 0-6-0 No. 130 has, in the upper part, a bursting grenade, a badge of Fusilier Regiments, and, below, three blue chevrons, thus denoting that the engine saw service overseas during the War. He also mentions that several North Eastern 0-8-0's have the same badge.

[Further reply to "TASMANIAN."]

**Longest M. & G.N. Run.**

Before the war the longest non-stop run over the Midland and Great Northern system was, in the summer, between Peterborough and Melton Constable, a distance of 69·3 miles (not 71·3 miles, as shown by a slight oversight in the Summer Train Services article). The train concerned was the 1.5 p.m. express from King's Cross, and the corresponding return working; the former was booked to cover the 69·3 miles in 97 min., at an average speed of 43 m.p.h.

[Reply to R. T. NINNIS.]

**Great Central 4-4-2 No. 1090.**

"Atlantic" No. 1090 of the Great Central Railway (now No. 6090 in the L.N.E.R. list) was originally built with three high-pressure cylinders, Walschaerts motion being provided for the outside cylinders. The engine has since been rebuilt as a two-cylinder 4-4-2 with inside link motion, uniformly with the other two-cylinder "Atlantics" of the G.C. Section. No. 1090, in the original form, was the only engine of its type.

[Reply to B. K. COOPER.]

**The East Kent Railway.**

This is an independent system of light railways originally constructed more particularly in connection with Kentish coal developments, though passenger trains are operated on several routes. The system is quite independent of the Southern Railway and is worked by a miscellaneous collection of engines. We have never described it in detail, though there have been many incidental references.

[Reply to S. E. R.]

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*Correspondence for this section, with or without photographs, is invited.*

**Kalighat-Falka Railway.**

THE Kalighat-Falka Railway is one of the numerous small-gauge lines which radiate from the suburbs of Calcutta. This is a 2-ft. 6-in. gauge line, and runs from Anajherat, on the Eastern Bengal broad-gauge line from Sealdah terminus to Budge-Budge, to Falka, a small village 27 miles south of Majherat, and about 24 miles from Calcutta. There are 11 intermediate stations, and two flag stations, and the service consists of six trains a day each way, stopping at all stations. The average time for the single journey is about three hours, inclusive of stops, or about 2 hr. 40 min. net. The track is single, but trains can pass one another at certain stations.

The locomotives are small 2-4-2 tank engines with long narrow side tanks, and powerful headlights are provided for night running. The rolling-stock consists of old four-wheelers, but accommodation is provided for all classes of passengers and special compartments are provided for Indian ladies. Each train is usually made up of five of these coaches and a brake van at each end. First-class passengers must be few and far between, but first-class compartments have electric lights and fans, and also lavatory accommodation. The locomotives were built by Bagnall and Company; most of them about 12 years ago.

Some few years ago it was doubtful if these small concerns like the K.F.R. would continue as paying propositions, as the advent of the motor-bus was a severe handicap. To-day, however, the motor-bus is present in increasing numbers, and now serves a valuable purpose in linking up the railway with the many small villages which lie on either side of the lines and scores of villagers now use these light railways where very few did previously.

The country through which the K.F.R. runs is typical of Southern Bengal, being flat and mainly agricultural and pastoral. Nearly all the fruit and vegetables for Calcutta are grown in this district, and a heavy traffic is dealt with nearly all the year round. This part of suburban Calcutta is now undergoing rapid and intensive development as a residential district under the auspices of the Calcutta Improvement Trust, and this fact, coupled with an increasing passenger traffic, should ensure the K.F. railway of a prosperous future. Nearly all the small lines of this nature are worked by one or other of the many large agency houses in Calcutta, and the Kalighat-Falka Railway has McLeod and Company as managing agents.

[A. J. GUSH.]

**German Locomotives.**

REFERRING to Mr. H. M. le Fleming's desire for further information in regard to 4-6-2 locomotives in North Germany, a three-cylinder Pacific was seen in Anhalt station, Berlin, attached to a train labelled for Leipzig. The driver informed me that it was not a compound. I based my statement that three-cylinder Pacifics were being worked in the North on the fact that those I saw were externally similar to the one in Berlin. The train to which this engine was attached was composed of four-wheeled stock, carrying only third and fourth-class, so I took it to be an excursion, as it was booked right through. The interesting point about the train, however, was that the Pacific was piloted by a 4-6-0 No. 38.2673, although the weight of the train could not have exceeded 250 tons. I think this 4-6-0 is of the former "P8" class, which, as Mr. le Fleming pointed out, is seen in all parts of the country. It is highly probable that the Pacific was formerly a "Saxon State" locomotive, which was being worked back to its home system. Thus, unless the four-cylinder class, which Mr. le Fleming says is common in the North, is very similar to the "Saxon" three-cylinder Pacific, it looks as if these locomotives are running on Northern metals. But, if the presence of a "Saxon" locomotive in Berlin is a unique case, further information



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on the running of former "State" locomotives on "foreign" lines would be interesting.

The number of Pacifics in use is steadily increasing. In August, 1927, I spent two hours at midday on Köln station without seeing a single 4-6-2. Last August, quite a number were seen in that district, together with large 2-8-2's on trains from Cassel. I was interested to learn that Mr. le Fleming had seen four-cylinder compound 2-8-2's. I had a good run behind a three-cylinder 2-8-2 myself, which was probably a simple. German engineers thus seem still undecided on the vexed question of compound *versus* simple. The recent general acceleration of all important trains shows that the management of the German Railways is becoming alive to the need and value of faster trains. The time of the Berlin-Hamburg non-stop has been reduced by ten minutes since 1927, bringing its average speed from 51·4 to 53·8 m.p.h. The German system is undoubtedly the most efficient on the continent, and I think that its safety record over the last few years is second only to that of the Great Western.

In regard to Mr. H. Waldorf's remarks, I should like to add that I saw a locomotive in Rotterdam, last July, practically identical with the 2-4-0 No. 1007 illustrated. It was making an effort to draw a small suburban train and was enveloped in clouds of steam.

[F. L. L. JONES.]

**A French Steam Tramway.**

THE photograph reproduced shows the terminus of the Tramways Bretons at La Houle, the harbour of Cancale, near St. Malo in Brittany. The Tramways Bretons is a narrow-gauge system running from St. Malo to Cancale, with a branch to St. Servan. The section of the tramways in St. Malo, St. Servan, and Paramé was recently electrified, and is operated as an urban tramway system. The services from St. Malo to Cancale, a distance of 18 km., are operated partly by petrol auto-cars and partly by the stock shown in the photograph. The locomotive is a 0-6-0 tank, and may be controlled from either end. The cars are seen in the background. They are all four-wheeled. On the occasion of my journey along this interesting little line, the train consisted of five cars (one of them first-class) and two vans.—[S. C. HAWTREY.]

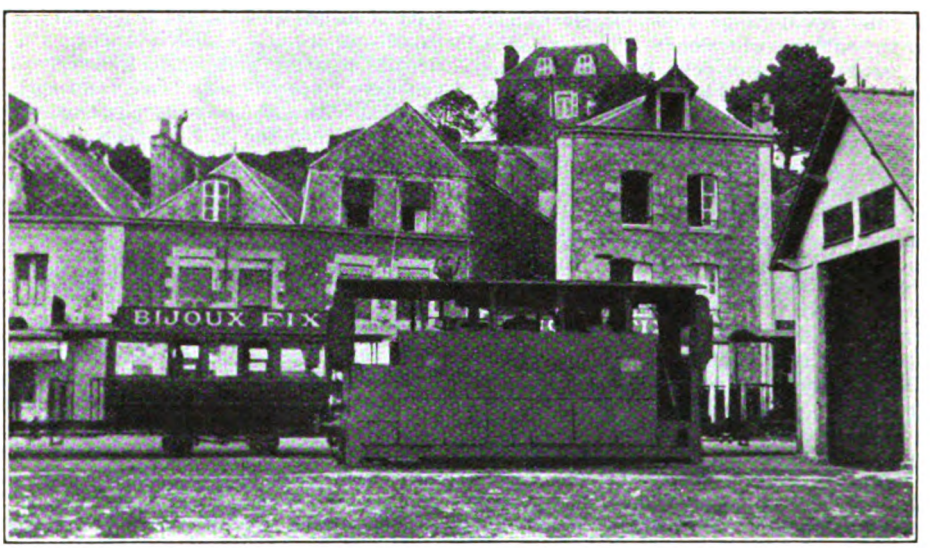


*Photo.*] [*S. C. Hawtrey.*

**STEAM TRAMWAY AT CANCALE, NEAR ST. MALO, BRITTANY.**

**Notes on Belgian Railways.**

MR. CROWTHER-SMITH has already mentioned that the signalling approximates closely to British standards. This statement only applies to the main lines, and on some of the less important lines all sorts of strange types may still be found. I am referring particularly to the Namur-Dinant line of the Nord-Belge Company. On this line the prevailing type of signal is the French board type, turned at right angles to the line for "danger" and parallel to

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it for safety. At Dinant station, however, is a signal of a very antique type : a girder post, surmounted by a signal arm with slots in it, and at the outer end a " blob," with three positions, horizontal for danger, inclined at 45 degrees for caution, and pointing right down, coinciding with the post, for safety. I never saw it used, and since I was there (1923) it may have been removed.

Reference is also made to the peculiar lay-out of Dinant station. Reduced to essentials, the layout provides for the interchange of right- and left-hand running. At one end the Nord-Belge has its lines arranged for left-hand running, as in this country, while alongside are the two lines of the Belgian State, arranged for right-hand running. In the middle of the station, however, each pair of lines crosses to reverse its track arrangement, so that at the further end of the station the Belgian State route to Tamines, which connects more particularly with the Nord-Belge route at the other end, has the right-hand arrangement. Similarly, the Belgian State route previously mentioned becomes left-hand on the Nord-Belge route to Namur. There are, of course, interchange connections, but this is the root principle of the station layout. It may also be explained that the station is joint between the Nord-Belge and the Belgian State Railways. One line continues to Jemelle and the other to Givet, though I forget which goes to which. The platforms are officially described as Platform 1 and Platform 2, this applying to the whole length of each platform. The respective sections of each platform are called ' Platform 1 à Droite,' or ' à Gauche ' (right or left), and since it all depends on which way one looks at the platform which is ' right ' and which is ' left,' some confusion results.

The Nord-Belge Company employs some 2-6-2 tank engines painted black or dark green, lined with light green, for its share in the traffic working, and I once saw a 4-4-0 (No. 307) painted in a style very similar to the L.B.S.C. brown livery. They were very well kept, in marked contrast to the Belgian State engines.—[E. J. Norris.]

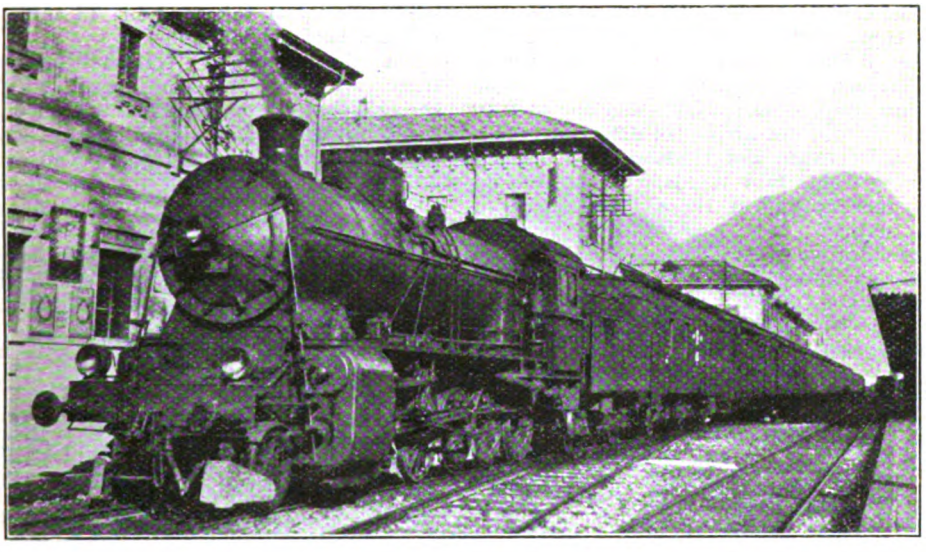

*Photo.*] [*W. H. C. Kelland.*

**PARIS-TRIESTE "RAPIDE" AT DOMODOSSULE.**

2-10-0 locomotive. First coach accommodates steam boiler for train heating in Switzerland.

**Canadian Train Services.**

The following notes, from Trois Rivieres, Quebec, relate to express train services in Canada. Dealing first with long-distance train arrivals at Windsor Street station, Montreal, C.P.R., the writer was travelling on the " Maine Coast Special " from Portland, Me. &c., but, owing to the Lachine Canal swing bridge being open, the train was delayed, so that the Hamilton–Toronto express reached Montreal first, 2 min. ahead of time, while the Maine express was 5 min. late. Thenceforward, eight long-distance expresses, one having a journey of 1,118 miles, and another of 2,886 miles (from

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Vancouver) were due between 7.20 and 8.30 a.m. Of these, six arrived dead on time, while the two remaining were each 2 min. late.

To lend point to this record of punctuality, it should be remembered that this was taken on Sunday, July 1, Dominion Day. In this week end, travel reaches a peak with people going away for holidays, and not only were the trains in question heavily loaded, but they had had to meet trains running in two or more sections in the opposite direction, the majority of their mileage being over single track. Loads varied from seven to twelve cars, all trains including several sleeping cars.

The list is not quite complete, there having been trains from Quebec at 6.25 a.m. and from North Toronto at 6.45 a.m. Of these, all I know is that they were clear before our arrival, so presumably punctual; while a train from Albany, N.Y., was due at 8.40 a.m., but did not arrive till 9.20 a.m. This was a Delaware and Hudson train, having running rights into Windsor Street station, and does not affect the C.P.R. record of punctuality.

As during this period long-distance expresses were despatched at 7.30 a.m. for New York (D. and H.), 8.30 a.m. for Ottawa, 9 a.m. for Boston, and 9.15 a.m. for Quebec, together with locals at 8.35 a.m., 8.45 a.m., and 9.10 a.m., it will be seen that a high degree of station efficiency is called for, especially as these trains, notably Nos. 2 and 22, and the "New York Limited," carry heavy consignments of express and baggage to be dealt with while the train is at the platform. The situation is not helped by there being only two running lines between the exit of the station and the coach yards at Westmount, two miles distant. This last, however, is being now relieved by the addition of a third track for empty carriages, signalled for operation in either direction. I may say that Windsor Street station has 12 tracks, each with two platform faces, one for passengers and one for baggage; the segregation of the latter is a great help in station operation. It would be interesting to know if any of your readers could match the above record for its combination of distance of starting point and punctuality of arrival.—[S. M. GOSSAGE.]

**Canadian Trans-Continental Trains.**

IN transcontinental services, the Canadian Pacific Railway operated the *Trans-Canada Limited* again last summer, the time for the 2,886 miles between Montreal and Vancouver being 89 hr. 15 min. westbound, and 88 hr. 30 min. eastbound, giving an overall average for the latter of 32·6 m.p.h. The Toronto section of this train, which joins the main section at Sudbury takes 85 hr. 45 min. and 83 hr. 10 min. for its 2,707 miles journey. They also operate the all year round trains, the *Imperial*, between Montreal and Vancouver, and the *Toronto* between Toronto and Vancouver, the former with a best time of 104 hr. 30 min., and the latter 91 hr. 20 min., both east bound. From Chicago, over its subsidiary, the Minneapolis, St. Paul and Sault Ste. Marie (the 'Soo' Line), two trains are operated to Vancouver, the *Mountaineer*, an all-sleeping car train like the *Trans-Canada*, and the *Soo-Pacific*. The former makes the east-bound trip in 72 hr. 15 min., giving an average of 31·4 m.p.h., while the latter takes 83 hr. 15 min., the mileage being 2,265 miles.

On the Canadian National Railway, there are two transcontinental services, the *Continental* from Montreal to Vancouver, 2,937 miles in 104 hr. 40 min., and a new through train from Toronto to Vancouver, 2,820 miles in 91 hr. 10 min.; both times are the eastbound one; westbound times are two to three hours longer. They also run a through Chicago-Vancouver service, in connection with the *Continental*, which it joins at Winnipeg, covering the 2,420 miles in 83 hr. 40 min. To Chicago the Canadian National has three trains from Montreal, at 10 a.m., 12.30 a.m., and 11 p.m.; and two return services, at 9.5 a.m., and 5.30 p.m. The best overall time for the 849 miles is by the 9.5 a.m. from Chicago, giving a service in 21 hr. 25 min., at an average speed of 39·7 m.p.h. The Canadian Pacific gives two down and two up services, leaving Montreal at 9.45 a.m. and 11 p.m., and Chicago at 9 a.m. and 5.40 p.m. The best time for the 853 miles is 22 hr. by the 9 a.m. from Chicago, giving an average of 38·8 m.p.h.

Toronto has two day services on each line, the Canadian National having a best time of 7 hr. 50 min. for the 334 miles and, the Canadian Pacific 8 hr. for its 340 miles, giving averages of 42·7 and 42·5 m.p.h. At night the Canadian Pacific has three sleeping-car expresses, one running to North Toronto station, while the Canadian National has two expresses, to the Union station. Ottawa has a day and a night service to Toronto, best time 7 hr. 15 min. for 259 miles. Between Montreal and Ottawa the Canadian Pacific operates four three-hour expresses during the day in each direction, while the Canadian National has two down and three up, one of which cuts this time to 255, the distances are respectively 111 and 116 miles. The Canadian Pacific has an extra three-hour train in each direction

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during the night, and the Canadian National another in the down direction.

To Quebec the Canadian Pacific gives two day services in 4 hr. 45 min., for 173 and 179 miles (one train is worked from Windsor St. Station, the other from Place Viger); and has also a night sleeping-car express, working through to both Montreal stations. The Canadian National has one 4 hr. 45 min. express in each direction in the day, and also a night sleeping-car service, 172 miles. To Halifax, *via* the old Intercolonial line, the Canadian National works a new all-sleeping-car express in 24 hr. for the 847 miles, carrying through sleeping cars for Metis, the fashionable St. Lawrence River resort, and also for Cape Breton Island; and there are two other expresses on this line, the *Ocean Limited* and the *Maritime*, the former taking 26 hr. 10 min. to Halifax. The Canadian Pacific has two expresses in each direction to Saint John, N.B., best time 16 hr. 5 min. for the 482 miles.

To Portland Me., the Canadian National has a day and a night service, best time, 9 hr. 50 min. for 297 miles; the Canadian Pacific, in conjunction with the Maine Central, has a through parlour-car day service, and an all sleeping-car express at night for the Maine Coast resorts on the Boston & Maine line south of Portland, taking 9 hr. 40 min. to Portland, 282 miles. This last is a very well patronized train, these resorts being very fashionable.

Boston has a day and a night service by each line, the Canadian Pacific working in conjunction with the Boston & Maine direct, the Canadian National working over its subsidiary, the Central Vermont, and then over the Boston & Maine. The Central Vermont has only recently been completely re-habilitated after the disastrous floods last November. There is also a day and a night service *via* the C.N., Rutland R.R. and B. & M. Best times are 10 hr. 05 min., *via* C.N., C.V., and B. & M., 329 miles; and 10 hr. 30 min., *via* C.P. and B. & M., 340 miles, giving averages of 32·6 and 32·4 m.p.h.

To New York the standard service is by the *Montreal Limited*, worked over the Canadian Pacific, Delaware and Hudson, and New York Central. This train takes 9 hr. 56 min. to New York, and 10 hr. 5 min. for the return journey, distance 375 miles, average 37·8 m.p.h. There is also a day service in 10 hr. 5 min. on this route, and a relief night train carrying coach passengers, for the *Montreal Limited* is an all-Pullman train. The Canadian National works day and night services in conjunction with the Rutland RR., and the new York Central, with a best time of 11 hr. 15 min. for 393 miles; and also has a through service to Washington *via* Central Vermont, New York, New Haven & Hartford, and Pennsylvania RR., with times of 18 hr. 10 min. to 17 hr. 45 min., from Washington, 670 miles. The *Montreal Limited* carries

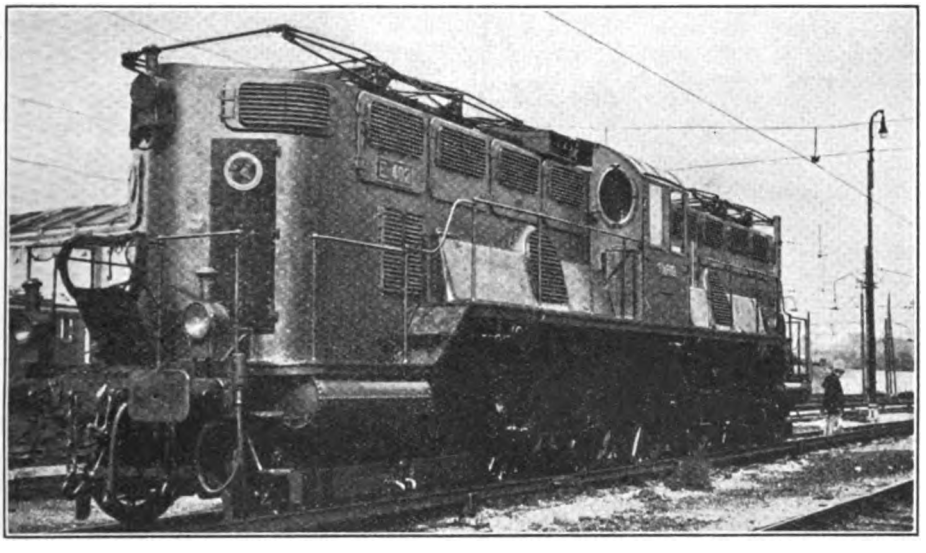

*Photo.*] [*W. G. Tilling.*

**PARIS-ORLEANS GANZ ELECTRIC LOCOMOTIVE.**

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through Pullmans from Quebec and Ottawa, as does the *Washingtonian* of the Canadian National.

An interesting new development in night travel is the introduction of single room sleeping cars, very much on the lines of an English sleeping car, designed for night use only. The Canadian National introduced these on its 11 p.m. Toronto express; and, on their proving popular, on its 10 p.m. express as well. The Canadian Pacific has just followed suit on its 10 and 11 p.m. Toronto expresses, and is also introducing them on its Quebec night service. They are arranged with inter-communicating doors to make double rooms when required.

[S. M. GOSSAGE.]

*Photo.*] [*D. S. Thom.*

NEW YORK CENTRAL LOCAL TRAIN NEAR YONKERS.

**A New York Central Local Train.**

THE photograph reproduced, taken on the outskirts of New York, shows a New York Central north-bound local train drawn by an electric locomotive. Leaving the Grand Central Terminal, such a train proceeds through the tunnels under Park Avenue, emerging into open air for the first time when more than two miles from the starting point. After crossing the narrow Harlem River, the train turns towards the stately Hudson, along the east bank of which it runs until Harmon, 33 miles from the start, is reached. Here the electric engine is uncoupled and a steam locomotive takes its place. On an incoming train the process is reversed, the steam engine being supplanted at Harmon by electricity. In this way the New York Central is able to maintain what is probably the finest railroad station in the world, free from soot, dirt, smoke, and foul air. The Pennsylvania Railroad, too, has a very fine station, where only electric locomotives are used. A train leaving the Pennsylvania station runs underground, passes under the Hudson River and emerges into open air in the neighbouring state of New Jersey. There, at a junction called Manhattan Transfer, about 8 miles from the start, steam is substituted and the train proceeds on its way. The Grand Central Terminal and the Pennsylvania station are the only two railroad stations in New York City proper, although across the Hudson in New Jersey there are several terminals, connected with the city by ferries, for steam trains, while in Brooklyn there is the Long Island Depot, for electric trains only.—

[D. S. THOM.]

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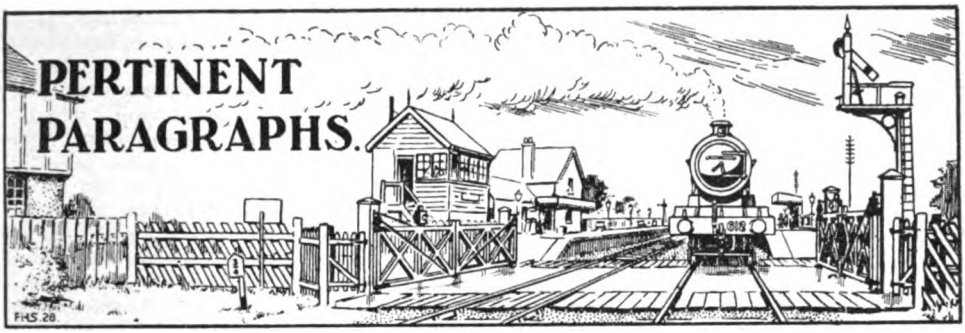


**Air Transport for Railways.**

AIR transport powers are being sought by the four principal British railway companies in the present Session of Parliament. Each of the four companies has a separate Bill, and the London Midland & Scottish and the London & North Eastern each promote a Scottish Provisional Order for the purpose. The powers sought by the four companies are identical. In every case the company is asking for authority to provide, own, work, and use aircraft and to convey therein traffic of any description, and to provide air transport services; to establish and use aerodromes, and to carry on any business subsidiary or ancilliary thereto; to acquire lands; to provide, erect and use all such hangars, garages, repair shops, refreshment rooms, appliances, equipment, conveniences, &c., as may be desirable; to demand and take fares, rates and charges in respect of traffic conveyed, services rendered and facilities afforded, and in respect of aerodromes; to make and enforce bye-laws; to enter into and carry into effect agreements with any company, body or person for the provision and working of aircraft and aerodromes, interchange of traffic, &c.; to provide funds and to hold stock, shares and securities for the purposes of any such agreement, and to guarantee the dividends and interest thereon; and to apply its funds to air transport purposes. From this summary it will be seen that the proposed powers are extremely wide, and cover every conceivable possibility in connection with air transport. This time, it is clear, the railway companies do not mean to be caught napping. They are asking to be put in a position to take full advantage, when suitable opportunities arise, of a new means of transport, the commercial possibilities of which are still comparatively undeveloped.

**Southern Railway Notes.**

MR. G. T. MOODY writes as follows :—

" In connection with correspondence in the November issue regarding the Southern Railway's Kent Coast train services, I find that in July-September, 1912, excluding day excursions and locals, the maximum number of down trains on weekdays was 18, with 2 extras on Fridays, and 5 on Saturdays. In the opposite direction there were 19 trains, 1 extra on Monday mornings, and 3 on Saturday afternoons. The best down trains were :— Victoria, 9.10 a.m. and 3.20 p.m. (Fridays and Saturdays), fast to Margate West in 90 min.; 10.15 a.m., fast to Westgate-on-Sea in 94 min. Holborn Viaduct, 5.10 p.m., fast St. Paul's to Margate West in 92 min. This train slipped a portion at Faversham for intermediate stations; when required, a second portion, leaving Holborn Viaduct at 5.12 p.m., was substituted for the slip. The best up trains were :—Ramsgate Harbour, 7.50 a.m., fast from Margate West to Cannon Street in 103 min.; Margate West, 10.10 a.m., fast from Westgate-on-Sea to Victoria in 92 min.; Ramsgate Harbour, 4.25 p.m. (Saturdays), and 5.5 p.m., both non-stop from Margate West to Victoria in 91 min. It will be noticed that the best business service terminated at Cannon Street, but started from Holborn Viaduct, an arrangement which continued until July 12, 1925. In addition to the non-stop trains already mentioned, others did not call between Victoria or London Bridge, and Whitstable or Herne Bay, and several were fast from suburban stations such as Herne Hill, Brixton, or Hither Green. While the best services in 1912 were faster than the present, it should be borne in mind that corridor stock and Pullman cars were not then in use, the suburban services were not so frequent and a number of them terminated at Kent House or Beckenham Junction, while the awkward and steeply graded Catford Loop was only used occasionally by main-line trains. Nevertheless, the time-tables give evidence of congestion, some of the margins for fast trains appearing small, and convey the impression that strict punctuality was not always expected or obtained.



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" As regards the opening of the new Thanet line in 1926, the leaflet distributed by the Southern Railway some time previously announced that the new Ramsgate station would open on July 2, and Dumpton Park on July 11. A blue inset to the time-tables for the period commencing July 19 announced that the opening of the new Dumpton Park station would be deferred until that date.

" Referring to the reply to ' Golder ' in the November issue, the L.N.E.R. (as successors to the G.N.R.) have running powers over the Southern Railway, *via* Ludgate Hill, to Victoria (Eastern section), Clapham Junction, Herne Hill, and Brockley Lane (see THE RAILWAY MAGAZINE, Vol. XXII). Besides goods trains, a transfer service for horse-box and similar traffic runs to and from Victoria. Ex G.N.R. 0-6-2 tank engines are usually employed.

" Recently, a number of repainted Southern coaches, both steam and electric, have appeared in a very dark green. The guard's outlook on many ex L.B.S.C.R. and S.E. & C.R. carriage brakes have been removed, and a metal sheet substituted. During the past summer a number of G.W.R. coaches have been in use on main-line services to and from Victoria (Central section). In the sidings at Tulse Hill to-day (November 14) was a large box wagon (with brakesman's box) belonging to the ' Deutsche Reichsbahn,' ' Trier 29516,' with inscriptions indicating that it was on hire to the L.& N.E.R., ' not common user,' and to be returned to Harwich. Also that it was not to be run on the Whitstable Harbour branch, nor between Tonbridge and Winchelsea *via* Hastings."

Mr. T. H. Donohue also writes :—

" Your correspondent ' Golder ' may like to know that there are—as I can testify from daily observations made from my house (between Clapham and Wandsworth Road stations)—regular daily workings into Victoria of both L. & N.E.R. and L.M.S.R. tank engines. The former arrive by way of the Underground, Snow Hill, Blackfriars Bridge, Metropolitan Junction and Loughborough Junction onwards ; whilst the L.M.S. come either by that route from Kentish Town or else by the West London extension line (which terminates on Longhedge Bridge, Battersea) and thence *via* Longhedge and Battersea Pier junctions. The traffic consists of vans and horse-boxes. A week-end working of the ' Sunny South Express ' sends a through L.M.S. corridor composite coach to Ramsgate on Saturdays and back to Liverpool on Mondays *via* Addison Road ; the train, as between Willesden Junction and Ramsgate, usually has two Southern passenger coaches and a brake-van as well, and is hauled by a 4-4-0 from the Kent Coast resort. At Willesden this vehicle is added to or detached from the Eastbourne portion, which a Brighton engine takes to and from Willesden."

**The Shortest Station Names.**

CORRELATING particulars given in the *Railway Gazette* in several recent issues, the *Railway Age* (U.S.A.) gives " what seems to be a complete list of all the shortest railway station names in the world." On the basis of this material, with its own additions, Sweden leads the list with six such stations : Ed, Fu, Le, Ra, Ro, and Od. France is second with three : Us and Ay, on the Chemin de Fer de l'Est, and Eu, on the Chemin de Fer du Nord. Hawaii contributes Ii on the Oahu Railway. The Argentine railways contribute Lu. There are only two two-letter station names on the railways of North America. Peculiarly enough, both of them are in Kentucky. Oz is on the Kentucky and Tennessee, and Uz is on the Louisville & Nashville. Several of our own readers have given some of these references.

A correspondent of *The Railway Gazette*, commenting on shortest station names, states that on the Sudan Government Railway, on the desert stretch between Wadi Halfa and Abu Hamed, there are nine stations named simply with the numerals 1 to 9. A large board with the number on it is the only " name " on each of these stations. The line in question is the original military line built by Lord Kitchener in 1896.

**Locomotive Nicknames.**

G.O.H. adds the following to those which have already been given :—*Sea Pigs*, G.C.R. 0-8-0's, instead of L. & Y. 0-8-0's ; *Coronation Tanks*, G.C. 4-6-2's ; and *Colts*, G.C. 4-4-0's (" King George V " type). He also expresses surprise that " perhaps the most popular of all the nicknames " was not included, that of *Tishy* for L.N.W. " Prince of Wales " 4-6-0's fitted with outside Walschaerts valve gear.

**Slotted Signals.**

COMMENTING on previous remarks, G.O.H. mentions that there is another signal of this type on the L.M.S. Manchester-Buxton line (L.N.W. route). It is the Middlewood distant signal, on the Hazel Grove side of the box. Like the " Brighton " signals, its arm works in a slot. " As far as I remember, the arm is made of wood, while the lamp and spectacle are fixed on the post below the

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slot. This type of signal is also very common on the Isle of Man Railway."

**Smooth-Running Expresses.**

MR. W. T. ALDUS, Publicity Officer, Bombay, Baroda and Central India Railway, referring to correspondence regarding tests made of the smooth running of English expresses by placing a penny on the footboard, directs attention to a letter which appeared in the *Times of India* on October 4. The newspaper extract to which reference is made in the form of a letter to the Editor. Having noted that "up to the present no financial loss appears to have been incurred" by those "enterprising persons who tested the smooth-running quality of fast expresses "anxious ten minutes" as to the safety of his rupee in regard to his own and other passengers' servants. However, "both of us, the rupee and myself, left Anklesvar station in safety, though at Baroda the writer pocketed both his pride and the coin," and "wended his way sadly and yet in part proudly along the platform," having come to the conclusion "that the honour of the railway—or of the *Frontier Mail*—was satisfied, the rupee having safely traversed some hundreds of miles of the woolliest country in Asia."

**A Seven-Day "Week-End."**

THE announcement that for the Christmas holidays week-end facilities would cover

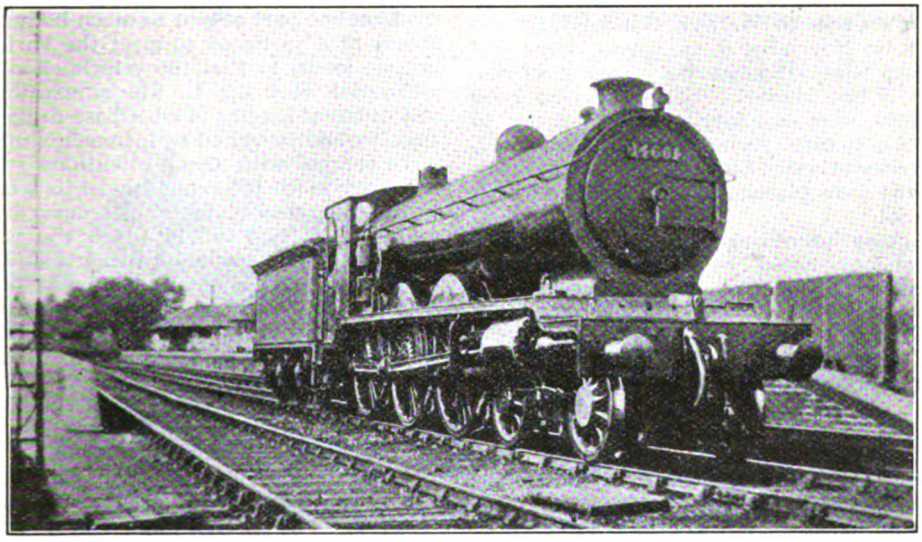

*Photo.*] [*J. G. C. Anderson.*

**L.M.S. 4-6-0 No. 14651 (CALEDONIAN No. 61) AT LANARK.**

in Great Britain by placing a penny on the carriage footboard," the writer "resolved to apply a similar test to one of our Indian trains." The train selected was the Bombay, Baroda and Central India *Frontier Mail*, but having no penny available he was obliged to substitute a rupee. Further, he "thought it was wiser to wait until the train was on the move before commencing the test," as there appeared to be "no object in exposing others to temptation unnecessarily," nor could he suppose that the railway company would reimburse him "if any misguided individual were to give way to such temptation." The somewhat dangerous process of placing the rupee in position while the train was gathering speed was safely managed and is described in detail, while at intermediate stops the writer apparently had some

the period from early morning on Friday, December 21, to Thursday night, December 27, directed attention to the longest "week-end" on record before or since the war. It enables holiday-makers to travel by ordinary train to practically anywhere in the Kingdom at the rate of single fare-and-a-third, equivalent to only 1d. per mile on the double journey. Issued on Friday, Saturday or Sunday the tickets covered return on Saturday, Sunday, Monday, Tuesday, Wednesday or Thursday as desired; minimum fares, 4s. first-class and 2s. 6d. third class. It may be thought that the fact that outward facilities extend to Sunday night only was a weakness of the arrangement, in that, although large numbers of business people would be free over Christmas Eve, there would also be a



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substantial proportion who could not leave for the Christmas vacation until the Monday evening. This aspect is, however, covered by the usual generous selection of excursion facilities, for which, in numerous instances, the special trains run would be generally more convenient than the ordinary trains, and the later announcement providing for travel by ordinary trains at the same fares on Christmas Eve and following days.

### L.N.E.R. Express Traffic Notes.

MR. R. A. H. WEIGHT sends the following notes :—

Two heavy non-stop special trains composed almost entirely of first-class corridor, restaurant and " open " cars were run from King's Cross to Welwyn Garden City and back on November 8, conveying some 600 guests who attended the opening of the new Film Studios. Three-cylinder 2-6-0 engines were employed, and they ran to Hitchin to turn. As far as the supply availed, " Welwyn Garden City Express " large label-boards were placed on the coaches of each special.

Among interesting half-day long-distance excursions noted recently was one from Mexborough to King's Cross, worked by Doncaster Atlantic 4455 throughout, which ran *via* Retford and was not booked to stop on the G.N. section. One from Sheffield, calling at Grantham, worked through by Ivatt Atlantic 4428 (stationed at Sheffield G.C.) in very fast time ; and a fine train accommodating *Leeds Mercury* readers, who were regaled with meals *en route*, dining-cars being alternated with open third-class corridor coaches, and who enjoyed a " first-class non-stop flight " from Doncaster to London behind a Pacific.

" Shire " class 4-4-0 locomotive 245 *Lincolnshire*, on November 7, worked the Yorkshire express due King's Cross at 9.25 p.m. over the 76·4 miles from Peterborough Start in 82 mins., or in 3 mins. under schedule, with a load of no less than 396 tons tare, or nearly 420 tons loaded. Driver Sparshott and Fireman Waddingham.

### Transferring Motor Vehicles at Heysham, L.M.S.R.

WITH the growth in the manufacture of motor vehicles and gradual increase in the size thereof, difficulties arose in the shipment of the vehicles with the existing appliances. The L.M.S.R. has, therefore, been experimenting for some time with new appliances to meet present-day conditions, and as a result has introduced for use at Heysham an adjustable gear which is capable of dealing with four or six-wheeled vehicles having a wheelbase up to 20 ft. 6 in., with a weight of 10 tons and a height of 10 ft.

There is accommodation available on the steamer service between Heysham and Befast for vehicles up to this maximum wheelbase, and as a result of the provision of the appliance, motor omnibuses are being despatched regularly by the service. The conditions to be met in the design of this gear were, that it could be used by the harbour cranes or ship's derrick, and lift 4 or 6-wheel vehicles of a maximum weight of 9 tons, 4½ tons maximum axle load. Maximum height 10 ft., width 7 ft. 6 in. ; wheelbase, minimum, 11 ft., maximum, 20 ft.; weight of gear to be approximately 1 ton. No stress was to be put on the vehicle while being lifted, its condition being as if on the road, and no part of gear to touch bodywork. Means of adjustment to meet the variation in axle loads, so that the vehicle should be horizontal when lifted. The adjustment to suit different lengths of wheelbase to be such that it could be varied by increments of 1 in.

To comply with these conditions it was necessary to lift the vehicle under its wheels ; to do this, steel-plate troughs curved to a radius of 1 ft. 6 in., in which the wheels could rest, were made, of a length sufficient to accommodate a width over tyres of 7 ft. 5½ in. To obtain the required strength without increasing the weight unnecessarily, the upturned edges of plate were bent back, making a buckled section, at the same time forming a ramp for wheels when vehicle is rolled on to troughs.

To the ends of troughs hooks are provided to which the loops on ends of wire lifting ropes are attached, at a height sufficient to clear a vehicle 10 ft. high ; spreaders of tubing are fitted to the ropes, keeping them parallel and well clear of all bodywork. From the ends of these spreaders wire ropes run to the centre ring to which all four lifting ropes are attached. To keep the troughs at the same centres as wheels of vehicles, struts, made of tubing, are provided ; these take the horizontal thrust due to the angularity of lifting ropes, relieving the vehicle of any stress on wheels.

These struts are arranged to slide in guides fixed to ends of troughs and can be fixed to them by pins which pass through guides and strut. There are four pinholes in guides with a pitch 1 in. different to those in struts ; this arrangement allows of adjusting the centres of troughs 1 in., 2 in., 3 in., or 4 in., in either direction. To adjust the balance to suit the different axle loads, the wire rope at front and are rear fitted with a chain of six links ; by using a suitable link the centre of lift can be moved forward or back to suit the centre of gravity of loads.

When lifting six-wheeled vehicles, the

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bottom portion of one pair of lifting ropes is removed, a quick release pin being provided for this purpose. These are replaced by a compensating gear consisting of a snatch block with grooved pulley, through which a rope with loops at each end is reeved, thus making six lifting ends to rope gear. Three troughs are fixed to side struts to suit wheel centres of vehicles, the six rope ends being attached to the hooks pivoted to the troughs. By the use of a suitable link of the adjusting chains on front ropes, a horizontal lift can be obtained, the compensating gear adjusting itself to any equality in the loads on rear axles automatically.

**District Maps at Railway Stations.**

THE "Underground" group of railways has recently inaugurated a series of posters for exhibition at their stations which include very clear maps showing every thoroughfare within a radius of a quarter of a mile from the particular station. This action seems to be one which is likely to be very widely appreciated, in that Greater London is so extensive that even residents in the metropolis may be unfamiliar with other than main thoroughfares in districts not their own, while visitors who find the "Underground" system of lines very convenient for getting about are often in difficulties when they arrive at a station which they have been informed is the nearest to their destination for lack of detailed knowledge of the way after leaving the station. We anticipate that these posters will be widely consulted by travellers of both classes, and will, at the same time, avoid the necessity for inquiries from station staff and passers-by. The measure is, in fact, one which is worthy of adoption on a wider basis, in that it is often one thing to reach a particular station and sometimes quite another to find one's way in a strange locality to the actual place which it is desired to reach.

**A Unique Train Formation.**

THE winter formation of the down "Atlantic Coast Express" of the Southern Railway is one which probably has no parallel, either in this country or, for that matter, in any other. It consists of nine coaches, every one of which is for a different destination. From the rear end the coaches are labelled in order for Honiton (detached at Salisbury and proceeding thence by a semi-fast at 12.46 p.m.); Sidmouth, Exmouth *via* Budleigh Salterton (both detached at Sidmouth Junction; Exeter (the restaurant car); Plymouth, also detached at Exeter; Bude, Padstow (both detached at Okehampton); Torrington (detached at Barnstaple Junction); and Ilfracombe. Another remarkable feature is that, apart from the restaurant car, every one of the passenger coaches is of precisely the same type—a composite brake corridor, with four third-class and two first-class compartments, and a small luggage and guard's compartment. The "Atlantic Coast Express," therefore, now takes pride of place over the neighbouring "Cornish Riviera Limited Express" of the Great Western Railway

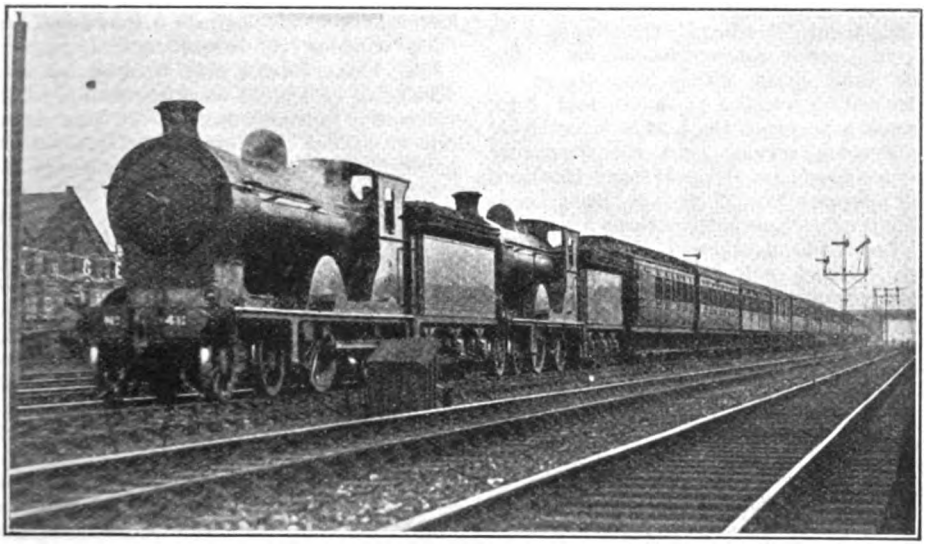

*Photo.*] EDINBURGH AND GLASGOW EXPRESS, L.N.E.R. [*R. Piedot.*

N.B. 4-4-0's, Nos. 9412 and 9436.



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as the most "multi-portioned" train in Great Britain; since the abolition of the Exeter slip, the normal formation of the latter express consists of portions for Weymouth, Minehead, Ilfracombe, Kingsbridge, Newquay, Falmouth, St. Ives and Penzance, or eight in all.

**The Heysham Boat Services.**

THE replies to enquirers that have appeared in our "Why and Wherefore" columns relative to the train services on the English side connecting with the Heysham-Belfast steamer sailings appear to have aroused no small interest among readers, judging by subsequent correspondence received. Mr. Harold Smith appears to voice the opinion of those in the Leeds and Bradford district when he writes: "So far as Leeds and Bradford are concerned, the 7.15 p.m. from Leeds (Central), with its through coaches from Bradford (Exchange) at 7.23 p.m., is not now considered to be the Belfast Boat Train, either officially or by the travelling public. I have just been looking at a poster of the L.M.S. advertising the Heysham service, and the departure times are given as 9 p.m. from Bradford (Forster Square) and 9.30 p.m. from Leeds (Wellington). No departure times are shown from Leeds (Central) and Bradford (Exchange), but a side-note to the column giving departures from Halifax, Todmorden, &c., states that the train referred to is through from Leeds to Heysham. The Bradford (Forster Square) station departure time-table describes the 9 p.m. slow train to Skipton as the "Belfast Boat Train," in heavy capital letters; the Bradford (Exchange) departure sheet indicates the 7.23 p.m. as "Express to Manchester, &c.," adding in a final parenthesis "(Belfast Boat Train)." Even a through carriage from Bradford to Heysham by the latter train will not induce the Bradfordian to make the much longer and slower journey *via* Manchester, if he can help it, but it is a pity, on the other hand, that it is not possible to arrange a through carriage from Bradford to join the 9.30 p.m. express from Leeds (Wellington), and so avoid the slow journey to Skipton and the change there. The 9.30 p.m. from Leeds to Heysham is now really an independent train from Leeds, with its own restaurant car; to this are attached through coaches off the 5-p.m. from St. Pancras, the main portion of which, restaurant cars included, works through to and terminates at Bradford."

**Irish Railway Notes.**

THE following notes have been sent by Mr. Brian Trapnell, in regard to the Rosslare district:—

"During the past year the Woodenbridge-Shillelagh branch has been worked by several different engines, notably, ex M.G.W.R. 0-6-0 Tank No. 552, ex M.G.W.R. 0-6-0 No. 588 (now rebuilt with G.S.W.R. pattern cab, &c.), and G.S.W.R. rebuilt 0-6-0 No. 158. Old Macroom 2-4-0 Tank No. 489, noted by a correspondent passing Waterford, was at Wexford shed for some time shunting, but has now gone. It may have had a spell on the above-mentioned Shillelagh branch. Engines on this branch, and at Wexford, Enniscorthy, Rosslare and Kilkenny sheds are sub-shedded from Waterford. No. 44, the 4-4-0 mentioned in recent issues, was for a long time at Kilkenny, was then at Rosslare shunting, and is now at Wexford. No. 158, mentioned above, was at Rosslare shed for some months.

"During this year, the Rosslare boat train has been worked by 2-6-0's Nos. 377, 381, 382, and 385, but latterly 377 and 382 have been working it. Early in the year the '333' class 4-4-0's also worked on it on occasions, and often work the Sunday train when it is lighter. No. 337 of this class is not, as stated in the October issue, undergoing rebuilding at Inchicore, as she is back working from Rosslare. She was away during August, and may have been up for light repairs. She is still in her old condition.

"For the past six months the *St. Patrick* and *St. David* have been working the Fishguard-Rosslare route, with the *St. Andrew* away on hire on the Southern Railway's Southampton-Havre service. The *St. Andrew* is now back again and the *St. Patrick* is off for much needed dry docking and overhaul. The *Great Southern* is on the Waterford route, with the *Great Western* on the Channel Island route. I understand that the City of Cork Company's boat *Moorfowl* is working the Fishguard-Cork route, while their *Kenmare* is on the Liverpool route."

**Locomotive Design and Appearance.**

COMMENTING upon Mr. Derens' remarks in the October number, Mr. E. J. Davey writes as follows:—

"May I state that, while in sympathy with Mr. Derens' remarks, I feel that the question is really wider than it appears from them. It will be generally agreed that the railway locomotive represents probably the most majestic machine conceived by the human mind, and appears to be almost a living creature. Therefore, locomotive engineers should bear this in mind, and pay attention to securing shapeliness of outline, &c., and make their iron steeds symbolical of graceful and beneficent power. Mr. Derens deals with the fitting of unsightly apparatus giving an alleged increase in

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efficiency, but, whilst this is a very real and difficult 'snag,' the question appears to be wider than this. The point is that many locomotive engineers have adopted standards giving an unnecessarily ugly appearance. A striking example of this is represented by the funnel patterns standard on the G.E.R. between 1886 and 1922. To 1900, we had the diabolically ugly 'stove pipe.' Since then, a very handsome 'three piece' pattern has been adopted. This small detail alone makes or mars a locomotive (artistically speaking), and cannot be objected to on the plea of lessening efficiency.

"Unfortunately, the 1923 grouping standard adopted in the majority of cases represent a retreat from the high standard of shapeliness set up between, say, 1901–1910. To enumerate a few: George Whale's revolutionary 'Precursors,' 4-6-0's and 0-8-0's, and his steel framed tenders showed a complete departure from previous Crewe practice, and yet these engines are striking for their simplicity yet elegance of outline. Then there is the Caledonian Railway. It is well known that the neat and artistic outline peculiar to this railway's locomotives so favourably impressed the Belgian State Railways that they copied it. Other examples may be cited of efficient and, shapely locomotives, viz., N.E. since 1886 the Drummond and Cumming engines for the Highland, and the G.W. 'Moguls' and 'Kings.' Unfortunately, the 1923 grouping has rendered these—in the majority—obsolete, and, perversely, the greater part of the new standards, as already suggested, do not come up to the former high level.

"The L.N.E. standard chimneys, for example. These follow G.N. practice, and in common with this railway's practice generally, do not show great artistic merit. The 'Brighton' 4-4-2's show how attention to these details would improve their very efficient sisters on the G.N., artistically speaking. The L.M.S. sins of commission appear to me to be chiefly the flattening of the tops of dome covers, so characteristic of Derby modern types, and the omission of the curved coping along the top of the side sheets. The former should be compared with, say, the G.C. pattern used on their 'Atlantics.' As regards tenders, the massive and graceful pattern standard on the L.N.E. appear to set off large modern types better.

"To sum up:—(1) In view of the limited number of types standard as a result of grouping, these should be made as artistic as possible, so as to give a finish and dignity worthy of the huge undertakings set up by the 1923 Act. (2) Although the point has not been previously raised, I would add that improving maintenance conditions (by more cleaning) would, I fancy, stimulate the men's interest in their charges, with, in all probability, a great reduction in wear and tear, thus giving great economies."

**The Dublin and Blessington Steam Tramway.**

WE are indebted to Mr. C. J. Coghlan for the following notes:—

"The Dublin and Blessington Steam Tramway is now the only railway company situated completely within the Irish Free State not absorbed in the Great Southern Railway's system. It was fully described in the RAILWAY MAGAZINE for April, 1902, in an article by Mr. H. Fayle.

"The first six locomotives, built for the opening of the line in 1887, were built by the Falcon Engineering Works, Loughborough, and were, of course, Nos. 1 to 6; they were 0-4-0T engines (with saddle and well tanks) and were all cased in except the wheels. The coupled wheels were 2 ft. 6 in. in diameter, and the cylinders 9 in. by 14 in. All the set could be driven from either end, as could all the locomotives owned by the company, except No. 5 *Cambria*. Of these six locomotives, only one now survives, No. 6. Of the others, No. 3 was scrapped in 1927, No. 4 in 1898, and No. 2 was replaced in 1906.

"Messrs. Thomas Green and Co., Leeds, supplied a more powerful type of locomotive in 1892. No. 7, this was a four-coupled engine, with leading and trailing Bissel trucks, it had the usual two cabs, but the firing was done, as on all the double cab locomotives owned by the company, in the rear one. The leading dimensions were as follows: Coupled wheels, 3 ft. 6 in.; diameter; cylinders, 13 in. by 20 in. No. 8, a similar locomotive, built in 1896 by the same makers, had smaller dimensions and as built had only a trailing Bissel truck but was fitted with a leading truck of the same type in 1903. The coupled wheels of this engine were 3 ft. 3 in. in diameter, and the cylinders 13 in. by 18 in. Nos. 1, 5, 7 and 8 were withdrawn from service between 1911 and 1915. No. 9, built in 1899, was similar to No. 8, except for the fact that it was built with leading and trailing Bissel trucks. It was constructed by the Brush Electrical Engineering Company, Loughborough.

"In 1906 Messrs. Thomas Green and Co., built a 2-4-2 side tank engine for the line, it had 12 in. by 18 in. cylinders, and 3 ft. 0¾ in. coupled wheels. In 1914 this locomotive which was built as No. 2 became No. 10. During 1916 the company took over for a trial from the Dublin and South Eastern Railway their 0-4-0 side tank No. 70, built in 1906 by Manning, Wardle, as

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rail motor engine No. 2. After about two years this locomotive was found unsuitable for the line, and was handed over to the G.S.W.R., who named the locomotive *Imp*, which name it still carries. No. 70 was never re-numbered or repainted by the Dublin and Blessington Company.

"When the line parted with D.S.E.R. No. 70 in 1918 the G.S.W.R. sold to the company a locomotive built by the Hunslet Engine Company in 1894 to the order of Joseph Buggins and Company, and sent to Wexford, which had passed into the hands of that company. It was named *Cambria* and still carries that name. The Dublin and Blessington line numbered it No. 5. It is a 0-4-0 saddle tank with 10 in. by 15 in. cylinders and 2 ft 10 in. coupled wheels. It differs from the other engines on the line from the fact that it has not the double driving arrangement. The buffer beam height was altered at the works at Templeogue because it did not correspond with the other rolling-stock of the company. No. 5 has outside cylinders.

"The locomotives are painted a shade of dark green. The company undertakes all its own repairs at Templeogue works, which are commodious enough considering the size of the company.

"Recently the company, which never was in a flourishing financial condition, and is at present in a worse state than ever, on account of acute 'bus competition, had under consideration a scheme for the working of the line with petrol locomotives only, and an alternative scheme for working with the existing petrol locomotives, and the purchase of one steam locomotive of the Atkinson-Walker type.

"The company owns Nos. 1 to 2 petrol-electric cars built by the British Westinghouse Manufacturing Company and a Ford rail-motor car."

**Anglo-Scottish Express Train Services.**

WE have received an interesting letter from Mr. Meyrick J. H. Cramb, relative to the comments made by "Voyageur" on the competing East and West Coast Anglo-Scottish express train services, in his article on the summer train services, which appeared in the November issue. Mr. Cramb points out that the famous agreement of 1896 provides that while no *day* train by either route shall be booked publicly between London and Edinburgh in less than 8¼ hours, it is permissible for the East Coast Railways to run *night* trains from King's Cross to Edinburgh in 7¾ hours, and for the West Coast, similarly, to book night expresses from Euston to Edinburgh in eight hours; for both routes, however, the minimum night journey time in the up direction is fixed at 8 hours 20 min. For 20 years, from 1896 to 1916, the best night trains from London to Edinburgh by East and West Coast routes took 7¾ and 8 hours respectively, and for one brief summer only—that of 1923, the first year of the railway grouping—the same times reappeared. But the following year showed a slowing by 15 min., and since then there has been a further decline. But the London and North Eastern Railway, Mr. Cramb remarks, is still free to advertise night trains from London to Edinburgh in 8 hours 10 min. or, for that matter, in any overall time down to 7¾ hours, without infringing the agreement. In this connection, Mr. G. A. Pearson, in another letter, points out that in this year's winter time-tables of the L.N.E.R., up to October 15, the 7.30 p.m. "Aberdonian" express was publicly booked to reach Edinburgh in 8 hours 5 min. from King's Cross.

**The First Steam Whistle.**

MR. J. G. PEIRSON sends an extract which appeared in the *Yorkshire Weekly Post* some time ago. To some extent, this is a recapitulation of the story of the origin of the locomotive whistle as found in various books on railway and locomotive history, but it appears to be of sufficient interest to publish again.

"One morning in 1833, the engine *Samson* ran into a horse and cart crossing the line at Thornton, on the Leicester and Swannington Railway. The engineman, having but the usual horn, could not attract attention. This resulted in having an appliance made by a local musical instrument maker. It was put on in a few days, and tried in the presence of the Board of Directors, who ordered other trumpets to be made for all the engines which the company possessed." This steam trumpet, which was 1 ft. 6 in. in height and 6 in. in diameter at the top, is clearly shown in a drawing of Stephenson's engine, *Atlas*, built for the Leicester and Swannington Railway in 1834. In another drawing of their standard passenger engine of 1836, however, it is shown with the cup whistle as in use to-day. It is uncertain by whom this whistle was first made, but it is believed to have been the invention of William Stephens, a workman at the Dowlais Ironworks in South Wales, where it was in use in 1833. Sharp, Roberts & Company, then of Manchester, had occasion, in 1835, to send one of their workmen (Thomas Turner) to Dowlais to put up some shafting. This workman, who was afterwards employed at Beyer, Peacock and Company's, Manchester, brought home with him a sectional drawing of Stephens's whistle.

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This was shown to Mr. Fyfe, the locomotive superintendent at the Manchester end of the Liverpool and Manchester line. Mr. Fyfe adopted it at once, and its use soon became general on all railways. For many years Turner's pencil sketch was preserved by the late Mr. C. E. Beyer, who was principal partner in the firm of Beyer and Peacock Company, Gorton Foundry, Manchester, and for many years chief assistant to the late Mr. Roberts, who died in 1864. Mr. Roberts was a clever and noted locomotive engineer, who added characteristic features of design and advanced the standard of locomotive construction upon every railway in the kingdom. Mr. Roberts died in poor circumstances."

**The Highland Section of the L.M.S.R.**

MR. G. A. PEARSON sends some interesting notes in regard to his first journey over the northern portion of the Highland section of the L.M.S.R. Between Thurso and Georgemas Junction, No. 14404, *Ben Celebrig*, was the engine, while 4-6-0 No. 14682, *Beaufort Castle*, worked the train from Wick to Inverness. Although Georgemas Junction was left several minutes late, time was soon made up. Mr. Pearson stayed overnight at Helmsdale and left next morning by the 6.10 a.m. train. This was worked by 4-4-0 No. 14419, *Ben Mholach*, No. 14394, *Loch Ashie*, assisting from Dingwall. From Inverness, Mr. Pearson returned by the 3.45 p.m. mail train, a very heavy load of 16 coaches, worked by a "Clan" and a "Castle." The best run was from Pitlochry to Perth in 37 min.

**Changes at Dundee, L.N.E.R.**

MR. PEARSON also writes as follows: "On Sunday, October 9, the signal cabin at Esplanade station, L.N.E.R., was dispensed with, and the two and a half miles from Tay Bridge South Box to Dundee (Tay Bridge) Central Box is now one section. Apparently, if a train enters on the bridge from Esplanade station, another train can still come up as far as the station. The distant signal on the same arm as the home signal on the down line has been removed, and the outer distant signal has been brought farther over the bridge. The home signal on the up line has also been dispensed with. Two days later, the Royal train passed through *en route* for Newcastle. The engines were No. 6394, *Lord Glenallan*, and No. 9902, *Highland Chief*.

**New Year Railway Concessions.**

IN addition to various new facilities which are announced by individual railways, such as first-class weekly seasons, and provision for the further application of arrangements already in use, a statement has been issued through the Railways Information Bureau indicating a wide range of concessions which will become operative on January 1 next. The raising of the half-fare age for children from 12 to 14 years will be widely welcomed. Another valuable concession is that which allows of the issue of "party tickets" at reduced fares for a minimum of 8 instead of 12; associated concessions on the application of guaranteed excursion parties without minimum fare limitations; the lowering of the minimum for cheap fares for annual or periodical conferences from 200 to 100; and the new arrangements for Boy Scout and Girl Guide parties travelling to and from camps or rallies. The general application of break-of-journey facilities will also be appreciated, as also announcements as to mid-week period excursions by specified ordinary trains, the provision of end-of-week period excursions all the year round, the extension of the tourist ticket period from April 1 to October 31, and the contemplated issue of holiday season tickets on an extensive basis. These facilities will go far to remove many of the anomalies which now apply, particularly as regards facilities already available, but so limited that many possible passengers cannot take advantage of them. They indicate, moreover, that the railway companies are keenly alive to public requirements.

**Steel Sleepers on the Southern Railway.**

AN official statement has been issued by the Southern Railway as follows:—

"An initial order for 70,000 steel sleepers, equal to 5,000 tons of steel, has been placed by the Southern Railway with a British firm. The Southern, which was the first main-line company to install colour light signalling on a large scale in place of the semaphore signals, is thus the first British company to adopt the steel sleeper in preference to that made of timber. The supply ordered by the Southern Railway will enable about 35 miles of selected track to be equipped over a period of two years. Although this is not a great amount, it is the first step towards a new avenue of prosperity for the British steel industry, and as such the Southern Railway is glad to be able to take it.

"A ton of steel equals about 14 sleepers, and costs about £11, the sleeper complete costing about 15s. 6d. The 'chair' is integral (unlike the wooden sleeper, to which it must be separately fixed), and only the 'key' and two small plates remain to be provided. The price of timber sleepers has been increasing, due to shortage, and a further point in the present innovation is that all the most suitable timber is foreign.

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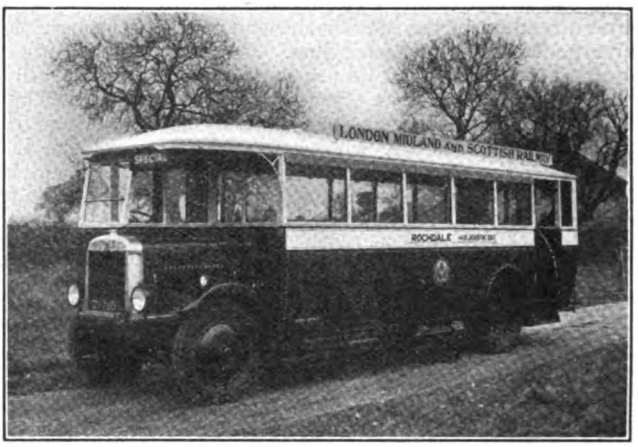
With the double view of avoiding the higher costs in future, and helping, if it could, a British industry badly in need of it, the Southern Railway has for some years past been making experiments with steel sleepers on the London-Portsmouth line, over which pass the heavy 'King Arthur' type locomotives, and the most modern rolling-stock. The results having satisfied their technical experts, the directors have approved the first substantial order for steel sleepers, and money which has hitherto gone abroad will now stay in Britain.

"When it is remembered that the annual consumption of sleepers on railways in Great Britain is in the neighbourhood of 4,000,000, it will be seen that if only 10 per cent. of this total were steel sleepers it would mean an order to the British steel industry of about 30,000 tons of steel every year. At the present issue price of timber sleepers, with the necessary chairs and fastenings, and assuming an equal life of 20 years for the steel and timber article, the cost of installation and maintenance, including renewal, is about the same, but if the price of timber sleepers increased by only 6d. there would be a considerable saving in favour of the steel sleepers, not only in the initial outlay but in maintenance and renewal. It is, however, anticipated that the life of the steel sleeper will exceed that of the timber, and from experience gained in countries where steel has been used, there would seem to be every likelihood of this. In Germany it is estimated at 30 years. On the other hand, if steel sleepers become general in Britain, it is reasonable to assume that the price will go down, which will enable still further economies to be effected."

We may add that the sleepers ordered have been increased in stiffness to the extent of 110 per cent. above that of the trial sleepers which are referred to above.




MOTOR BUS IN L.M.S.R. SERVICE BETWEEN ROCHDALE AND HALIFAX.

### L.M.S.R. Motor Omnibus Service.

On Monday, December 10, the L.M.S.R. inaugurated an omnibus service between Rochdale and Halifax, a distance of 18 miles. The service is operated by single-deck vehicles, the bodies of which have been constructed in the railway workshops. Twelve trips are made in each direction daily, augmented to an hourly service on Saturdays and Sundays. The service operated by the Rochdale Corporation ceases to run. The route followed forms a short cut between the two towns *via* Blackstone Edge, which rises to an altitude of 1,270 ft., whereas the more commonly used route follows a more circuitous course *via* Todmorden and Hebden Bridge.

For the purposes of this new service a number of vehicles have been completed, using Leyland chassis.

### Mr. L. L. King-Wilkinson's Problem.

A number of letters have been received from readers, including the following:—Thomas B. Sands, E. G. Twining, A. C. B. Brown, Herbert Wilkinson, J. R. Hollick and "Staffordshire Knot," and H. L. Simpson. All give the same solution, the 9.30 a.m. ex Newcastle (Central), which has South Wales and Bristol coaches. The sections travel together to York, and then proceed over the same route to near Swinton, but on different trains to Sheffield (Victoria and L.M.S. stations respectively). The main train is due at Gloucester (G.W.R.) at 5.10 p.m. *via* Nottingham (Victoria) and Banbury, while the Bristol through coach reaches Gloucester (L.M.S.) at 5.16 p.m. *via* Derby and Birmingham. Mr. Herbert Wilkinson points out that the corresponding return trains leave Gloucester at 11.3 and 11.19 a.m. respectively.

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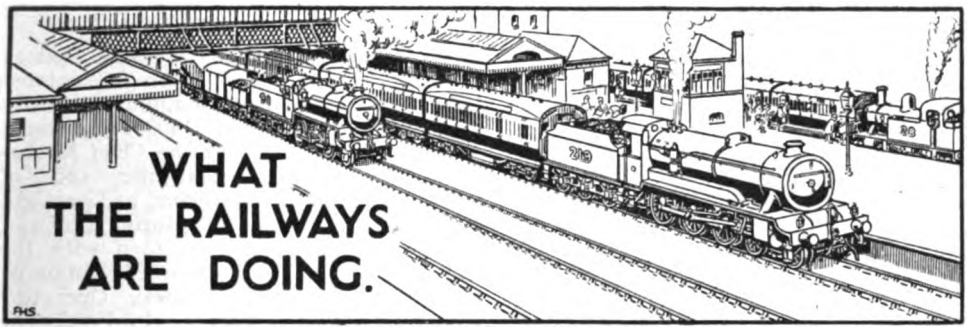


AT a meeting of the Superintendents' Conference of the Railway Clearing House, on November 16, the following gentlemen were unanimously elected Chairmen of the Superintendents' Conferences for the year 1929 :—

*Operating Superintendents' Conference.*

Mr. C. M. Jenkin Jones, Superintendent, North Eastern Area, London & North Eastern Railway.

*Coaching Traffic Superintendents' Conference.*

Mr. C. J. Selway, Passenger Manager, Southern Area, London & North Eastern Railway.

* * *

MR. T. R. DESTER, who has been appointed General Passenger Agent in America for the London Midland and Scottish Railway, began his railway career at Derby in the office of the General Superintendent of the late Midland Railway. He graduated through the Excursion, General, Rates and Fares, Parcels, Claims, &c., sections of that Department, and was for some years connected with the canvassing and operating of theatrical traffic on that railway. At the commencement of the Great War, Mr. Dester joined the Royal Fusiliers (London Regiment) as a private, serving in France from July, 1915, to November, 1919, excepting eight months in hospital, as a result of wounds and gas. When discharged in November, 1919, Mr. Dester held the rank of Captain and Adjutant. On resumption of his railway duties, Mr. Dester was attached to the office of the General Passenger Agent of the Midland Railway. On the formation of the L.M.S.R., he was transferred to the department of the General Superintendent (Passenger Commercial). Prior to his present appointment Mr. Dester served under Mr. Ashton Davies as head of the General Section in the Passenger Commercial Department. At New York he will succeed Mr. John Fairman, who retired at the end of 1928. Mr. Dester sailed from Southampton to take up his duties in New York, in the Cunard s.s. *Berengaria*, on December 5.

**MR. T. R. DESTER,**

Appointed L.M.S.R. General Passenger Agent in America.

* * *

MR. H. C. WALTON, General Secretary, Railway Benevolent Institution, will shortly be circulating to station masters and others the usual explanatory circulars and lists to enable the New Year's Day Collection to be made, and it is hoped that every railway employee will become members of the Casualty Fund for 1929, for which the collection is chiefly made by subscribing one shilling —the sum required to entitle the member to participate in certain specified benefits. The collection will be taken at all stations on Tuesday, January 1, next.

* * *

ARRANGEMENTS have been made through the Railway Clearing House, and with the approval of the general managers, that the four railways shall advertise jointly at Christmas, Easter, Whitsun and August Bank Holiday, in the London (*i.e.*, national) newspapers, instead of each taking space independently for exactly the same facilities. Each railway will carry the scheme through from start to finish in turn. The L.M.S.R. Publicity Department is thus being respon-



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sible for announcements in regard to Christmas excursion arrangements.

* * *

THE first reunion dinner of the Metropolitan Railway Old Comrades' Association —an Association composed of Metro. ex-service men—was held on November 23, presided over by Mr. H. S. Stewart, Secretary, at the Farringdon Street Restaurant.

Among those present were: — Lieut.-Colonel R. H. Selbie, C.B.E., General Manager; Lieut.-Colonel E. A. Wilson, O.B.E., M.C., Civil Engineer; Capt. J. S. Anderson, Solicitor; Mr. C. W. Clark, Architect; Major R. F. Morkill, M.C., Signals Supt.; Mr. C. Martin Clark, M.B.E., Resident Engineer, M. & L.N.E. Railways; Major A. C. Chauncy, T.D., President, G.E.R.O.C.A.; Capt. V. Gilbey, M.C.; Major H. J. Green, M.C.; Mr. R. O. Taylor; and Mr. H. S. Chapman, Chief Clerk to Secretary. After dinner the "Roosters" Concert Party—late of the 60th London Division—entertained the company with an excellent programme, the various war-time numbers being greatly appreciated by all.

* * *

AT a meeting of the Railway Students' Association of the London School of Economics, on Thursday, November 22, Brigadier-General H. O. Mance, C.B., C.M.G., in the chair, Mr. M. Fischer, an officer of the Hungarian State Railways, delivered a lecture, illustrated by lantern slides, upon the railways of Hungary.

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AT a meeting of the General Managers' Conference of the Railway Clearing House, Sir Ralph L. Wedgwood, C.B., C.M.G., Chief General Manager of the London and North Eastern Railway, was unanimously elected Chairman for 1929.

* * *

THE annual "Family Dinner" of the Railway Convalescent Homes was held on Saturday, November 17, in the Wharncliffe Rooms, Hotel Great Central, Marylebone, N.W.1, there being a record attendance numbering over 500. The Rt. Hon. Lord Aberconway, P.C., Chairman, Metropolitan Railway Company, and President of the Homes, was, unfortunately, unable to be present, but Mr. R. H. Selbie, C.B.E., Director and General Manager, came in his place and proved an efficient substitute.

* * *

MR. H. K. BOSTOCK, who has been appointed Divisional Superintendent, Nigerian Railway, has for some time past had charge of the L.M.S.R. engine sheds and repair shops at Camden. Educated at Repton School, Mr. Bostock entered L.N.W.R. service as a premium apprentice at Crewe in October, 1909, afterwards serving a pupilage under the Chief Mechanical Engineer. He held the office of Assistant Locomotive Foreman at Longsight for a period, but enlisted during the war, serving first as a private, then with the Inns of Court O.T.C., afterwards obtaining a commission in the Railway Operating Division, Royal Engineers. In France he was promoted to Captain, commanding the 49th Broad-Gauge Operating Company, R.E. He returned to L.N.W.R. service in October, 1919, and subsequently had charge of engine sheds at Huddersfield and Bangor, together with sub-sheds, eventually coming to London to take charge of the engine sheds at Camden.

* * *

THE reconstruction of the frontage of Mansion House station (District Railway), which is now complete, is to be followed immediately by improvements to the booking hall. The new frontage is modelled on the Morden line stations and is flood-lighted at night. The booking office is to be demolished and the site utilised for a cloak-room and an office for the issue of season tickets. Automatic ticket-printing and issuing machines will also be installed. A further improvement will be the construction of a new entrance to the subway leading to the west-bound platform.

* * *

COLONEL SIR JOHN W. PRINGLE in his report to the Ministry of Transport on the collision between a passenger electric train and the buffer stops at Charing Cross (Southern Railway) on September 19, places responsibility for the accident upon the motorman because of his failure to manipulate the brakes correctly. Sir John Pringle suggests that the motorman lost his nerve and consequently took his hand off the controller, thereby making an emergency application too late.

* * *

THE L.N.E.R. announces that the farm collection and delivery service has now been extended to include the following stations: Altrincham, Ashton-under-Lyne, Macclesfield, Oldham, Stockport, and Stalybridge. The L.N.E.R. is prepared to deliver and collect farmers' traffic to or from the above stations at the following charges:— Not exceeding three miles from the station, 3s. per ton; exceeding three miles, 6d. per ton per mile additional. Minimum charge

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for each separate collection or delivery as for 10 cwt.

* * *

THE Great Western Railway is showing a film illustrating the work of the western ports. Starting at Paddington, the route taken is through Cardiff, Newport, Swansea, Barry, Port Talbot, Penarth and Fishguard, also to Weymouth and Plymouth. Coal, iron, wood pulp, cereals, strawberries, pigs, and cattle are seen in different stages of transit, and an interesting view of the s.s. *George Washington* is also given. Machinery at the docks is shown working and various activities are covered.

* * *

THE following new L.M.S.R. appointments have been announced :—

*Chief General Superintendent's Office.*

Mr. J. W. Waddington, of Walsall and Bescot, succeeds Mr. W. G. Peet as District Locomotive Superintendent, Bristol.

Mr. H. G. Shortt succeeds Mr. J. W. Waddington as Locomotive Superintendent at Bescot.

Mr. I. E. Mercer succeeds Mr. Shortt as District Locomotive Superintendent, Bolton.

Mr. F. W. Seal, District Controller, Leeds, becomes District Controller, Saltley, *vice* Mr. French, retiring.

Mr. G. Rogers, of Staveley, succeeds Mr. Seal as District Controller, Leeds.

Mr. J. H. Westwood takes Mr. Rogers' place as District Controller, Staveley.

Mr. A. P. Hunter, of Bedford, is appointed District Controller, Coalville, *vice* Mr. Fern, retired.

*Overseas and Continental Department.*

Mr. T. R. Dester, of Derby, is appointed General Passenger Agent, New York, *vice* Mr. Fairman, retiring.

*Shipping Department.*

Captain W. Hill, Marine Superintendent, Heysham, to be Marine Superintendent, Holyhead.

Captain W. J. Roberts, Master of Holyhead and Kingstown Mail Steamer, to be Marine Superintendent and Harbour Master, Heysham.

Mr. A. T. Cotton, Marine Engineer, Fleetwood, to be Marine Engineer, Heysham.

*Chief Civil Engineer's Department.*

Mr J. Alexander, of Barrow, to be Assistant to Divisional Engineer, Hunt's Bank, Manchester.

* * *

THE Great Southern Railways Company has for some time issued books of travel coupons for journeys of 500 and 1,000 miles, at rates representing a reduction of approximately 20 per cent. on the ordinary fares for such distances. These tickets are used by commercial travellers and others who travel extensively by train, and are an attraction to those who might be tempted, by cheaper fares, to use the 'buses. In this connection the company has issued a somewhat novel poster, which is reproduced in miniature below. The poster, which measures 25 in. by 40 in., is effectively printed in bright red and blue inks on a white ground, and, as will be seen, the fact is stressed that intending passengers may travel when they like, where they like, and as often as they like, under the coupon scheme.

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[*Topical.*

**112-TON INGOT WORKED BY L.N.E.R. SPECIAL TRAIN FROM SHEFFIELD TO OPENSHAW, MANCHESTER.**

FROM the *London Gazette*, Tuesday, November 13 :—

*Engineer and Railway Staff Corps.*—Major G. S. Szlumper, C.B.E., T.D., A.M.Inst.C.E., to be Lieutenant-Colonel (August 18).

* * *

THE L.M.S.R. has put into service two specially constructed grain vans, which are a distinct improvement on the previous type of wagon, which after being loaded was covered with tarpaulin to protect the contents during transit. These new bulk grain carriers are constructed of metal. At the top are sliding doors through which the grain is emptied, while small windows fitted at the side enable the contents to be seen. The carrying capacity of these vans is 20 tons, double that of the older type.

* * *

A LETTERPRESS poster of a distinctly novel character has been issued by the L.N.E.R. It is cast on the lines of a theatre or music-hall announcement bill, and gives particulars of certain cheap fare excursion facilities for a stated period. The poster is to be issued weekly, and is for London consumption only. Good clear type, neatly printed in red and black ink on a white surface, enables prospective passengers to see at a glance the date, time and fare of any particular trip—and, as may be supposed, there is no lack of variety: the "turns" embracing Nottingham steeplechases, a trip to Cambridge, a long day at Southend, and a cheap week-end in Antwerp. The first poster issued covered the week commencing November 25.

WORK is about to commence on alterations at King's Cross station (City Railway) which will lead to considerable improvements in the booking arrangements there. The system known as "lift passimeter control" is being adopted. This system has given excellent results at London Bridge and Angel stations, and provides for the booking clerk having in his office complete lift-control mechanism and the latest type of rapid printing and issuing ticket machines, which print and issue at the rate of four tickets per second.

* * *

MR. T. A. BACON writes: "Equipment for colour-light signalling on the section of the Southern Railway lying between New Cross and Hither Green stations is now nearing completion, the up starting signals of the latter station having been fitted with the two-aspect colour-light signals usually used at the junction of the manual equipped and power equipped sections. The operation of the signals in this new section will be controlled from a large box under construction on the north side of the line, just after leaving St. John's station, at a point only a few yards distant from the present St. John's "B" box. This latter is a very small wooden structure which is doomed to destruction on the completion of the new girder bridge, which even now overshadows it."

* * *

THE directors of United Railways of the Havana and Regla Warehouses regret to announce that, owing to ill-health, Mr. D. M. MacRae has been compelled to resign his position as General Manager of the undertakings in Cuba. Mr. Lightly Simpson, Chief Mechanical Engineer of the Cordoba Central Railway, has been appointed to succeed Mr. MacRae.

* * *

AT certain Inner Circle stations on the Metropolitan Railway, kiosks have been opened for the sale of "broadcast" gramophone records. Some of these records are played at frequent intervals throughout the day—quite obviously to the enjoyment of many travellers, to whom, of course, the fine volume of sound, as their trains enter the stations, comes as a great surprise.

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THE L.N.E.R., in co-operation with the Royal Dutch Air Lines, has recently inaugurated a combined rail, sea and air service between Great Britain and Hamburg, Copenhagen and Malmo. Leaving London (Liverpool Street) at 8.15 p.m., passengers embark for the Hook of Holland at Harwich and travel by train from the Hook to Amsterdam, which they reach at 8.44 a.m. An aeroplane leaves Amsterdam at 9 o'clock and arrives at Hamburg at 12.55 p.m., Copenhagen 3.5 p.m., and Malmo at 3.35 p.m. These services are in operation daily.

* * *

WITHIN 48 hours of its despatch from Paddington goods station, G.W.R., a vacuum-fitted goods van, loaded to Truro on the 10.10 p.m. West of England freight express, was again being loaded in London for the same destination. In less than two days the van had made a journey of about 600 miles and been loaded or unloaded three times.

* * *

A BILL " to enable a railway company to participate in the provision of mail cargo and passenger services in the Western Highlands and Islands of Scotland " was presented in the House of Commons on November 13 by Colonel Ashley, supported by Secretary Sir John Gilmour and Sir William Mitchell-Thomson.

* * * *

HANDBILLS issued by the L.N.E.R. give the latest time for handing parcels in at the London termini (King's Cross, Liverpool Street, and Marylebone) to ensure delivery in certain provincial towns the same day. For example, parcels for Colchester may be handed in at Liverpool Street up to 3 p.m. for delivery the same day, Peterborough parcels at King's Cross up to 1.15 p.m., and Leicester parcels at Marylebone up to 12 noon.

* * *

A NEW express, partially replacing the present 10 p.m. from Buchanan Street, Glasgow, leaves that station at 10.35 p.m. and runs direct to Perth. Thence it gives the usual through services to Inverness (also Wick and Thurso) and to Aberdeen.

* * *

MR. C. R. CLINKER mentions an instance where a train of one coach attached to five engines can be seen regularly. Obviously this is not likely to occur with a booked passenger train, but may arise where a vehicle is required to convey railway staff and a number of engines have to go to the same place at about the same time. In the instance noted, the vehicle is run each Sunday morning from the direction of Filton Junction to bring men from Stoke Gifford sidings after completion of duty, the engines having also finished for the day. In the example quoted by Mr. Clinker, the five engines concerned on the occasion he noted them were: 4-6-0 No. 4068, 0-6-0T's Nos. 1841 and 1230, 2-4-0T No. 739, and 2-6-0 No. 6373.

* * *

WITH reference to Mr. Crowther-Smith's letter on page 391 of the November issue, Mr. H. M. Le Fleming points out that only Bavarian locomotives are intended to be green, with black and yellow lining. Nearly all Prussian locomotives have recently been painted black, with the entire framing and wheels light red oxide, but this year pillar-box scarlet has been introduced for everything beneath the footplate, with the exception of the cylinders and side rod fluting, which are black. In this condition, the engines produce a very striking effect.

* * *

ACCORDING to Reuter's Paris correspondent, the Paris " Underground " lines carry 792 million passengers annually, the corresponding totals in London and Berlin being 310 and 229 millions. On December 19, 1927, the Paris lines carried a record of 2,366,000. New York electric railways carry 1,887 millions, but have a much wider range. There are, in Paris, 174 stations, 37 of which are junctions, and as many as 279 trains are running simultaneously at rush periods.

* * *

THE London & North Eastern Railway Company has placed orders with J. Thornycroft & Co. for 24 omnibuses, and with the A.E.C. Company for a further 24. All the buses will be of the 32-seater type.

* * *

A NEW record in radio reception was recently established when a Canadian National Railway passenger train, equipped with radio receiving set, picked up station 5SW, Chelmsford, England, while travelling at full speed near Port Arthur, Ontario.

* * *

LONDON BRIDGE station is to be fitted with a system of loud-speakers which will inform passengers, as they enter the station, at which platform they will find their train. Preliminary experiments were made at the Eastern Section station some time ago.

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VEHICLES of new designs are being placed in service on the famous "Twentieth Century Limited" New York-Chicago express, including cars with eight sections, 1 drawing room and 2 compartments; with 6 compartments (which can be connected up as suites) and 3 drawing rooms; and 14-section sleeping cars.

* * *

REUTER'S Cologne correspondent indicates that in view of the conspicuous success which has attended the introduction of the train, running between the Hook of Holland and Basle, it is proposed to introduce a similar train running between the Hook of Holland and Bavaria *via* Wiesbaden. It is claimed that the present express is the most profitable train running over the German railways and that on an average 160 passengers use it daily.

* * *

EXISTING L.N.E.R. road motor services operating in County Durham have been considerably augmented. This has been made possible by replacing the older vehicles with 12 new motor saloons of the most approved modern type. The new vehicles are 33-seater Thornycroft saloon buses. They have convertible semi-bucket type seats.

* * *

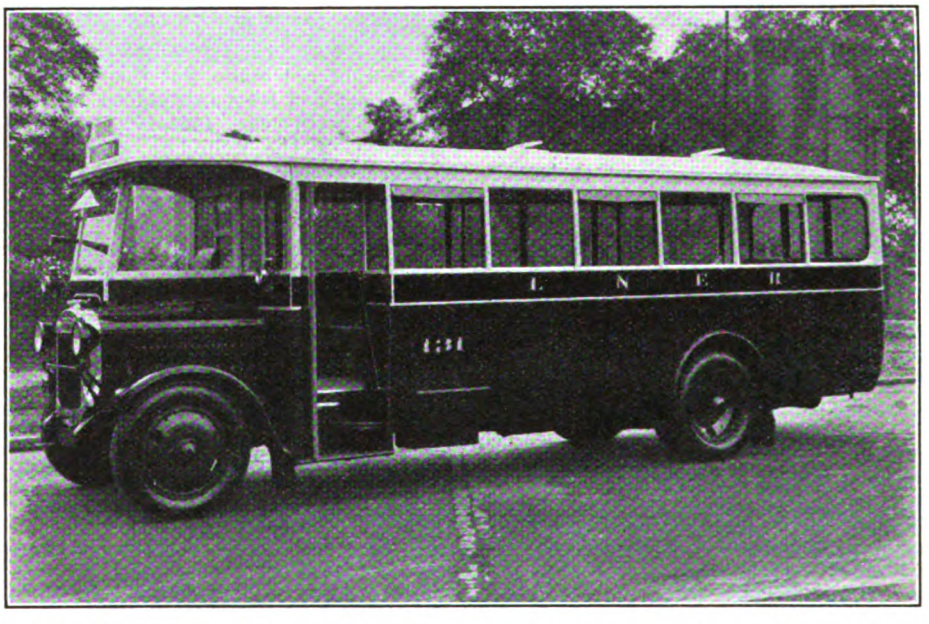
THE L.N.E.R. announces that over 200 telephones have been installed at their stations in rural areas. These telephones are available for public call office purposes.

* * *

THE L.M.S.R. recently ran a half-day excursion, with restaurant-car facilities, from Euston to Bournville, including an inspection of Messrs. Cadbury's works and garden village.

* * *

REFERRING to a remark in the November number as to the changing over of a restaurant car at Achnasheen, Highland Section, L.M.S.R., from a down to an up train, Mr. R. Smyrk mentions a similar procedure in force on the Algerian State Railways. The car leaves Biskra at 8.00 and arrives at El Berd, the crossing station, at 12.20, where it is transferred to the up train leaving at 12.24 for Biskra, due there at 17.17. It would seem that passengers from Biskra would have a rather early lunch.




**THORNYCROFT 33-SEATER AS USED FOR AUGMENTED SERVICES IN COUNTY DURHAM.**

* * *

MR. G. A. PEARSON, writing from Dundee, mentions an interesting train peculiarity which, it is suggested, may be set as a problem for the readers who are keen students of time-tables and train services. The problem is thus set:—What train is partly composed of three sections, each starting its journey on a separate train but from the same town? Combined in one

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train, these coaches travel over a hundred miles further to their destination. This applied only until September 22, and in both directions.

* * *

THE London Midland and Scottish Railway Company announce the following appointments in connection with the retirement at the end of the year of Mr. S. H. Hunt, Vice-President :—

Mr. Frederick G. Evans, Secretary of the company, to be Vice-President.

Mr. O. Glynne Roberts to be Secretary of the company (the Secretary's Department is to be amalgamated with the Central Executive Office, and Mr. Roberts will retain his present position as Secretary to the Executive Committee and Assistant to the President).

Mr. H. V. Mosley's title is changed to that of Chief Officer for New Works and Parliamentary business.

Mr. R. D. Roberts has been appointed Irish Traffic Manager, L.M.S.R.

Mr. J. R. Worrall, District Land and Estate Agent, Euston, has been appointed Divisional Land and Estate Agent (Scotland), Glasgow, in place of Mr. J. Fulton, retiring.

Mr. W. H. C. Clay, Assistant Land and Estate Agent, has been appointed Land and Estate Agent in place of Mr. F. J. Stannard, retiring.

* * *

IN consequence of the retirement of Mr. F. W. Stanley, Horse Superintendent in London, a reorganisation is being made under which the control of the Horse Department in the Southern Area, L.N.E.R., will be divided between two horse superintendents, one of whom will be stationed in London and the other in Manchester.

Mr. J. H. Smith, at present Horse Superintendent, Leeds, has been appointed Horse Superintendent for the Southern portion of the Area, and will be stationed in London, and Mr. J. Bolton, Horse Superintendent, Manchester, has been appointed in charge of the Northern portion, and will remain located at Manchester.

* * *

A BRIDGE at East Linton, on the Edinburgh-Berwick main line of the L.N.E.R., was, on Sunday, December 2, demolished and a steel structure erected in its place within 18 hours. To enable the engineer's department to have entire possession for the required period, trains between Edinburgh (Waverley) and stations south of Berwick were diverted *via* St. Boswells and Kelso. A local service of trains was run in each direction between Tweedmouth and Berwick in connection therewith. Passengers to and from East Linton, Dunbar, Innerwick, and Ayton were conveyed by train and motor-bus. Several trains in connection were given altered schedules.

* * *

ON Tuesday, November 27, there was a large gathering of members of the G.W.R. (Birmingham and District) Lecture and Debating Society, to hear a lecture on "The Railways of Africa," by Mr. J. F. Gairns, Editor of the RAILWAY MAGAZINE. The chair was occupied by Mr. F. A. Taylor, stationmaster at Snow Hill station, and among those present were Mr. G. W. Offer and Mr. G. A. Watkins, Assistant District Goods Managers, and Mr. R. E. Lampitt, chief clerk to the District Goods Manager.

* * *

MR. F. G. SPINALE writes :—"On December 4, two special trains were run from Victoria to Canterbury in connection with the enthronement of the new Archbishop. Each consisted of vestibuled corridor stock. Large 4-4-0's Nos. A. 511 and A. 758 were employed. In addition, an ordinary service usually terminating at Gillingham (Kent) was specially extended to Canterbury for the occasion."

* * *

THE third annual dinner of the Victoria and Battersea Park Clerical and Supervisory Staff, Southern Railway, was held on December 8 at the Pillar Hall, Victoria station. Mr. P. C. Hopper, M.B.E., presided. Mr. W. Mepsted, one of the Assistant Stationmasters, proposed the health of "The Ladies and Visitors," Mr. T. Sammer and Miss P. Archer responding. Mr. W. R. Holkham, Passenger Agent at Victoria, proposed the toast of "The Chairman." During dinner a section of the Southern Railway Musical Society's orchestra rendered selections under the leadership of Mr. G. B. Tolley.

* * *

THE November meeting of the Railway Club took place on November 19, when Mr. H. A. Vallance read a paper on the West Highland Railway. The author first traced the history of the line, and then, by means of an excellent series of lantern slides, took the members along the course of the railway, thus well illustrating construction difficulties and the scenic beauties. In conclusion, the locomotives and rolling-stock used were described and the train service facilities commented upon.

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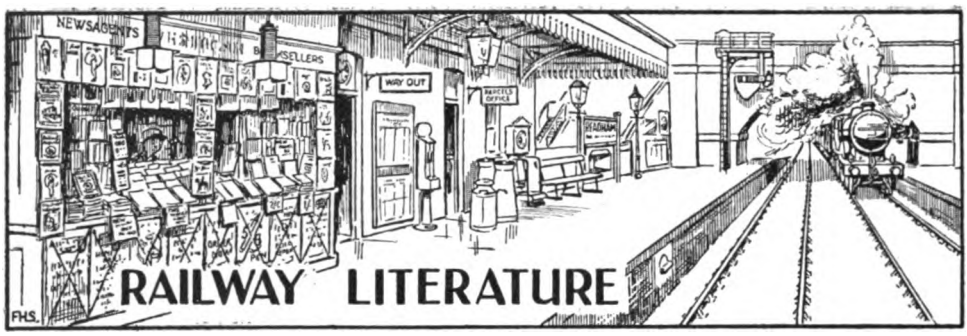


THE LOCOMOTIVES OF THE LONDON BRIGHTON AND SOUTH COAST RAILWAY, 1903–1923. By J. N. Maskelyne, A.I.Loco.E. 1928. London: The Locomotive Publishing Co. Ltd., 3, Amen Corner, E.C.4. 156 pp. 4 colour plates, 6 photographic illustrations, and 56 line drawings. Price 5s. net.

This volume continues the story of locomotive developments on the L.B. and S.C.R. from the point at which "The History of the Locomotives of the L.B. and S.C. Railway," published in 1903, had left it, to 1923. The style of the earlier work, has been followed. Line diagrams of representative engines, prepared by the author, are given. The first chapter is devoted to the history subsequent to 1903 of the locomotives designed by Mr. William Stroudley, and is of particular interest as showing the changes through which many locomotives pass in the course of a long career under the superintendency of several locomotive engineers. Chapter II covers the locomotives built by Mr. R. J. Billinton, all of which are still in service at the present time. In Chapter III the locomotives designed by Mr. D. L. Marsh are described. These include the "Atlantics," the 4-4-2 tanks, and their later development, the 4-6-2's. The final chapter describes the additions made to the locomotive stock by Mr. L. B. Billinton during his superintendency from 1912 until amalgamation. The engines built at Brighton during this period include the 2-6-0's, some of which rendered such excellent service on heavy war traffic, and the large 4-6-4 express passenger tank engines, the last engines to be constructed at Brighton works prior to grouping. It is perhaps a little unfortunate that the present volume does not contain quite the same amount of interesting reminiscence as characterised the previous volume, but the numerous technical details are given in such a way as to hold the reader's attention throughout. Mr. Maskelyne has contributed a worthy addition to the records of Brighton locomotive history, and it will no doubt be read with very considerable interest by the large body of "Brighton" enthusiasts.

LONDON: TOWN AND COUNTRY. A GUIDE FOR THE RESIDENT AND THE VISITOR. Prepared by the London "Underground," and published by The St. Catherine Press, Stamford Street, Waterloo Road, S.E. 300 pp. Price 1s. net.

This publication differs from others of its kind in that—as its title indicates—it deals not only with London, but also with the country immediately adjacent thereto. Once upon a time London was so big that the surrounding country was difficult of access, but motor traction has changed all this, and the omnibuses that traverse the streets now journey far out into the rural districts. The Guide makes no pretence to treat exhaustively of London and its environs, but to deal briefly but informatively with the chief features of interest, which are collated in a way that enables the reader to turn at once to the features or places that appeal most to his inclination. The descriptive matter is capitally done, and its interest is greatly enhanced by the numerous illustrations and maps and plans which are to be found within its 300 pages. A very full index is also a good feature; the attractively coloured cover is another.

HANDLING LONDON'S UNDERGROUND TRAFFIC. By J. P. THOMAS, M.I.E.E., M.Inst.T. Published by "London's Underground" 55, Broadway, Westminster, London, S.W.1. 238 pp. 145 half-tone reproductions, drawings, diagrams, &c. 7 folded charts. Price 7s. 6d. net.

A short preliminary notice was given last month. The book calls, however, for extended notice as follows:—

The volume commences appropriately with an Introductory chapter giving useful statistical data and brief histories of the lines constituting the London "Underground" railway system. Then follows a careful review of the "Organisation of the Operating Department." This is, of course, the largest of any department, its wages bill alone accounting for an expenditure of nearly £1,000,000 per annum. Under the



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Operating Manager is the Superintendent of the Line, all sections then coming under either the Outdoor or the Indoor Assistant. There are approximately 1,200 operating employees on the Metropolitan District Railway and 3,500 attached to the " tube " railways.

Chapter II describes very fully the methods of Staff Education and Control. Chapter III, entitled " Arranging the Service," explains how, after study of traffic demands, the time-tables and duty-sheets are compiled and adjusted, considering also the conditions tending to the efficient conduct and maintenance of the service. Charts are supplied showing how train loading is studied on the basis of data collected by train checkers. Seasonal peculiarities of traffic are, of course, considered, while further remarks cover the " Black List," on which trains whose schedules seem to call for revision are placed. Train-running summaries and the influence of connection requirements at exchange stations, with the conditions introduced by through-running to and from other railways, also receive attention. Under the heading " Production," with sub-sections on Lay-over Times, Rush-Hour Traffic, Non-Stops and First and Last Trains, remarks based upon practical experience are made.

Chapter IV, " Providing the Service," deals with the Compilation of Time-tables and Duty Sheets. Working time-table extracts are reproduced and discussed, with reference to the compilation of duty sheets, rolling-stock working (times of starting, coupling, uncoupling and stabling of trains), " straight " and " split " turns, factors to be considered in working out duty sheets, booking off, and the preparation of six months' roster sheets. The working of representative trains is studied in detail in order to bring out the many factors which have to be taken into account. Specimen motorman's train-running schedule and a trainman's duty card are also illustrated. The widespread effect of a comparatively small time-table alteration is very clearly shown by a specimen in which black and red ink alterations are reproduced.

Chapter V, " Problems of Operation," deals with the Length of Station Stops, Position of Signals, Layout of Tracks and Gradients and Curves. These are studied in close detail with the aid of diagrams, charts and plans of terminal, loop, and other stations and junctions. The various types of layout are discussed in detail, and a number of examples are shown in plan or by photographic reproduction. The next chapter deals with " Control of the Traffic," the Work of the Traffic Controllers, Problems of Branch-line Control, Break-down Arrangements, Single-line Working during Repairs or Obstruction, and Control Office Equipment, with reference to indicators and safety devices. Chapter VII is devoted to Signalling, while Chapter VIII covers the various emergency devices and other appliances in use.

In Chapter IX, Mr. Thomas discusses Abnormal Traffic Movements, such as those involved in meeting requirements in the case of important football matches, air pageants and other exceptional events (several very remarkable photographs are reproduced), dealing also with the opening of new lines and the special traffic occasioned thereby, and the provision of staff and equipment to meet these exceptional demands. Chapter X deals with District Rolling-stock, and describes the plant in use in District steam days, early electric stock, and the development to present-day patterns. Chapter XI continues the story for the City & South London, Central London, and London Electric Railways.

In Chapter XII, Mr. Thomas leaves train operation to deal with " Booking the Passenger," referring to the use of Coin-freed Ticket Machines, Automatic Ticket-issuing Machines, Passimeters, " Automaticket " Machines, " Rolltic " Machines, Ticket-printing and Change-giving Machines, and other booking-office equipment.

" Station Design and Working " provides material for Chapter XIII.

Chapter XIV is devoted to a study of Relations with Employees, and in Chapter XV, Mr. Thomas follows his very full and detailed study and explanation of " Underground " organisation, " methods, material and men," by a study of the relation between " Electric Railways and Other Means of Transport," leading up to comparisons showing that for all but the shorter journeys electric railways have a definite advantage over surface means of transit.

Finally, in Chapter XVI, Mr. Thomas summarises the Growth and Achievements of the " Underground." An appendix gives " Pertinent Facts (and Statistics) concerning London's ' Underground,' " a collection of data very useful for reference purposes.

Mr. Thomas is to be congratulated upon the manner in which so much information is concisely, interestingly, and yet fully presented, for the very complete collection of photographic and other illustrations, and for the instructive and illuminating chart and diagrams included, while we also congratulate the " Underground " upon the decision to make the volume generally available instead of limiting it to internal circulation.



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THE REIGN OF THE HOUSE OF ROTHSCHILD. By Count Corti. [Victor Gollancz Limited, 14, Henrietta Street, Covent Garden, W.C. 1928. Price 25s. net.]

The work before us constitutes the second volume of the Story of the Rothschilds, bringing the history of that famous house up to date. The first volume of Count Corti's book was called "The Rise of the House of Rothschild," and carried the narrative from the foundation of the bank by Meyer Amschel Rothschild towards the end of the eighteenth century down to 1830. The story as a whole forms a most fascinating romance of high finance, far outstripping in interest most of the fiction we ordinarily read. Much of the present volume deals with the part played by the Rothschilds in the early history of railways in Europe, and we hope to treat this interesting subject more fully in a subsequent issue. The book has been translated from the German by Brian and Beatrix Luner, who seem to have done their work very competently, and to have produced a most readable translation. The work has been turned out by the publisher, as regards printing, paper and binding, and such necessary features in a book of this kind as notes, bibliography and index, in a most creditable manner.

THE RAILWAY AND LOCOMOTIVE HISTORICAL SOCIETY, BULLETIN NO. 17.

This bulletin, like its predecessors, is well produced and includes quite a number of items of real interest. Mr. G. W. Bishop (who is English Representative and will be pleased to supply particulars of the Society from his residence, 57, Warwick Road, Kenilworth) deals with steam tramways in the British Isles, Mr. J. W. Smith adding further notes on steam trams in Scotland and Ireland. Mr. Smith also describes Mr. F. C. Winby's *James Toleman*, the peculiar non-coupled engine with an oval boiler, which was built in this country and shown at the Chicago Exhibition in 1893. Mr. Warren Jacobs supplies a chronology from 1826 to 1926 of principal railway events in New England. There is also an article on "train speeds and safety" in 1826, and quite a number of miscellaneous items dealing with old locomotives or early railway history and matters connected therewith. Finally, an article on the South Carolina Canal and Railroad may be mentioned.

J. S. FRY & SONS LTD. send a copy of a bi-centenary issue of *Fry's Works Magazine*. It is beautifully produced and includes a number of interesting illustrations and appropriate articles, many, of course, being of historic interest. Under the heading "The Coming of the Magician," reference is made to the important part which the railways have played in providing transportation facilities.

MECCANO LIMITED send a booklet describing the constitution and objects of "The Hornby Railway Company," which has been formed, we gather, with the idea of encouraging the working of model railways with Meccano plant.

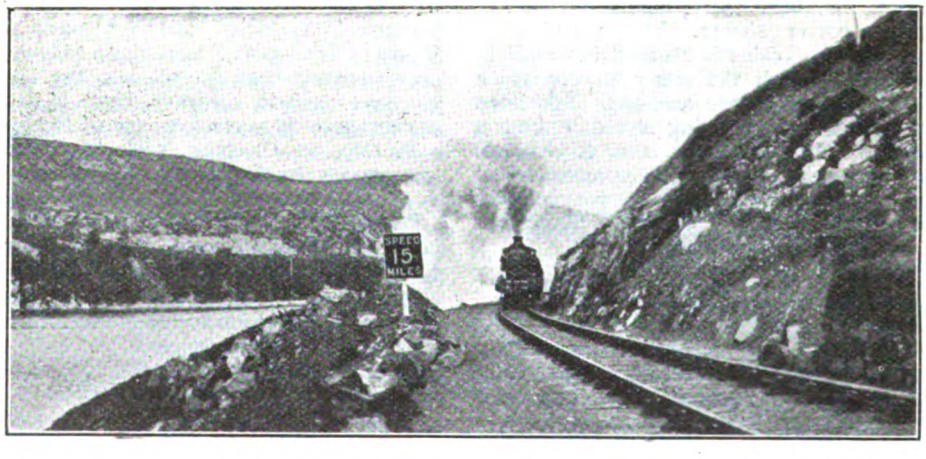


*Photo.*] ON THE WEST HIGHLAND LINE, L.N.E.R. [*B. N. Peach.*

This notable view, sent by Mr. R. T. Legget, was taken between Tulloch and Corrour stations, alongside Loch Treig.

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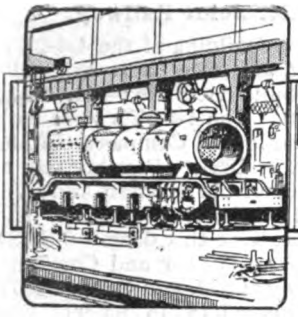
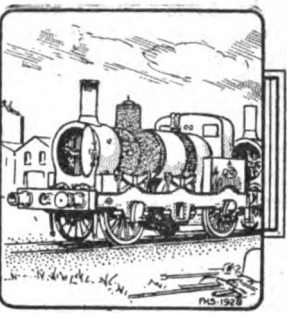


# LOCOMOTIVE MATTERS.



## L.M.S.R.

No. 5512 is an "Experiment" 4-6-0 named *Terrier*. N.S. 4-4-0's are now Nos. 5410–14. *Marlborough* is No. 5523.—[E. J. NORRIS.]

L.N.W. "Renown's" have been working Midland Section trains on the C.L.C.—[E. BURY.]

L. & Y. 2-4-2T's Nos. 10901–5 are now on Midland services from Manchester (Central). At Manchester (London Road), L.M.S.R. No. 5170 *Trafalgar* and L.N.E. No. 5170 (4-6-2T) were noted standing near together.—[R. DYSON.]

"Skye" bogies Nos. 14271 *Sir George* and 14283 have been shunting at Inverness in place of No. 15010. 0-6-0's Nos. 4312–3–4–5–7–8 have been noted on the Highland Section.—["TASMANIAN."]

## L.N.E.R.

4-6-2 No. 2579 *Dick Turpin* was recently noted at Leeds (New) station.—[H. SCOTT.]

No. 707 recently worked a special from York conveying H.R.H. Princess Mary, Viscountess Lascelles, to Hull.—["MONK BAR."]

No. 5507 ("Director" type, Leeds) now painted black, but retaining name-plates and brass splashers, has been working the "Queen of Scots" Pullman express in her turn between Leeds and King's Cross. The Cambridge engine arriving King's Cross on the 3.20 p.m. express now runs back light as far as Hitchin for working the 7.12 p.m. thence to Cambridge, and the regular double-heading of the 6.15 p.m. ex King's Cross has been discontinued. Further new 0-6-2T's arrived at King's Cross in November, as follow:—Nos. 2663–5 and 2667 ex Hawthorn, Leslie & Co., Nos. 2683 ex Yorkshire Engine Co. No. 4442 is back at work after works overhaul and still bears her Great Northern arms on the splasher. The heavy non-stop dining car London excursion to Leeds and back on Sunday, November 18, was hauled by No. 245 *Lincolnshire* and Atlantic No. 4460. New Doncaster "A3" Pacific No. 2745 *Captain Cuttle* was recently exhibited at Darlington. The recent Royal Special train *en route* from Ballater and Newcastle was worked non-stop from York to King's Cross by Pacific No. 4477 *Gay Crusader*, driver Stacey. It was formed of L.M.S. stock. Royal specials between King's Cross and Wolferton have been composed as usual of the L.N.E. Royal train and run non-stop between London and King's Lynn, *via* Cambridge, hauled by "Super-Claud" No. 8783.—[R.A.H.W.]

4-6-2's Nos. 2580 *Shotover* and 4472 *Flying Scotsman*, which worked the first L.N.E.R. London-Edinburgh non-stop in both directions, were recently observed at Gateshead side by side. The following "Shires" are working through Sunderland from Leeds (Neville Hill) shed:—Nos. 234 *Yorkshire*, 236 *Lancashire*, 251 *Derbyshire*, 253 *Oxfordshire*, 256 *Hertfordshire*, 318 *Cambridgeshire*, 320 *Warwickshire* and 322 *Huntingdonshire*. On Saturday, November 3, the afternoon Leeds express weighed 450 tons and was worked from Newcastle by No. 320 *Warwickshire* piloting No. 322 *Huntingdonshire*. No. 4419, G.N. booster-fitted Atlantic, recently worked the afternoon Manchester-Leeds-Sunderland-Newcastle express from Leeds (Neville Hill) shed.—[C. SELBY-WILKINSON.]

New 4-6-2's Nos. 2747 *Coronach*, with No. 2746 *Fairway* are now in service with non-corridor tenders.—[G. R. GRIGS.]

0-6-0T No. 8317 (Mid-Suffolk Light Railway No. 2) has gone for scrapping. 0-6-0's Nos. 07037–8–9, 7119, and 7121–3–4 have all been seen recently. 0-4-4T No. 8108 has been working the Witham-Maldon branch. Small 0-6-0T's Nos. 7153, 7157, 7245–6–7 and 7251–2 are now used on the Eye branch and the Mid-Suffolk line. They were formerly Blackwall line engines.—[IPSWICH READER.]

## G.W.R.

Mr. Norris' suggestion that the 2-6-2T's conclude at 3187 does not appear to be justified. The G.W.R. Engine Book dis-



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tinctly states " Serial numbers 3150–3190." Further, Nos. 3188, 3189 and 3190 have all been seen.—[G. TIMPLER, C. A. W., and " 1473 FAIR ROSAMUND."]

There are (or were) several tank engines with names which are not mentioned in the G.W.R. Engine Book. These include No. 2192 *Ashburnam*, 2194 *Kidwelly*, 2195 *Cwm Mawr* (at Weymouth), 2197 *Pioneer* (scrapped), 2196 *Gwendraeth* (stationed at Danygraig), 359 *Hilda*, 969 *Seymour Clarke*. All these engines are 0-6-0T's. Further 4-4-0's which have been scrapped are 4152 *Calendula*, 3701 *Gibraltar*, and 3704 *Lyttleton*. Several locomotives of the " Hall " class have been completed, Nos. 4900–1–2–3–4 having been seen at Swindon. A number of 0-6-0T's have been seen at Cardiff, repainted black, with the words " Great Western " in yellow on the tanks, from Caerphilly shops.—[" 1473 FAIR ROSAMUND."]

Several " Castle " engines work regularly between Swansea and Carmarthen. " During the summer of 1927, I noted No. 4078 *Pembroke Castle* and No. 4097 *Kenilworth Castle* together at Carmarthen, and last summer I noted 5006 *Tregenna Castle* and 5007 *Rougemont Castle* at the same place."—[S. J. TEMPLE.]

Further conversions are Nos. 5119 and 5123. Nos. 5306 and 5399, however, have passed through Swindon without alteration. No. 5123 is now classed " Blue D," instead of " Red A."—[F. J. T.]

4-6-0 No. 2925 *Saint Martin*, has been renumbered 4904.—[" KING EDWARD VII."]

## S.R.

Lynton and Barnstaple 2-4-2T No. E762 *Lyn* was recently noted at Eastleigh for repair. It is reported that further " Lord Nelsons," Nos. E861–5, are to be built. Nos. 0125 and 0520 are the only 4-4-2T's (L.S.W.R.) left on the duplicate list. They have been working the Seaton and Lyme Regis branches. A558, has been working on the Wenford mineral line near Wadebridge. 0-4-2T No. B612 still retains the copper cap to chimney. 0-6-0T's Nos. B 96 and B 695 are being converted to 0-6-2T's.—[" TINTAGEL."]

No. E854 *Howard of Effingham* and No. E855 *Robert Blake* are now in service.—[T. H. DONOHUE and A. G. C.]

4-4-0 No. A754 worked the Prince of Wales's special from Dover to London on his hurried return from Africa.—[T. H. DONOHUE.]

## M. & G.N. Joint Railway.

As regards the rebuilding of the 4-4-2T's, two of them, at any rate, were originally 4-4-0T's. The rebuild dates are :—41, 1904 ; 20, 1909 ; 9, 1910. The 4-4-0T's were built by Hudswell, Clarke and Company, No. 9A in 1879 and 20A in 1881. Possibly one of these is a rebuild of old Eastern and Midlands Railway 4-4-0T *North Walsham*, built by the same firm about this date. 0-6-0ST No. 16A is by Fox, Walker and Company, and was rebuilt by the M. and G.N. in 1877. 0-6-0T's are numbered 15, 16, 93–99. Nos. 16 and 94 are at Norwich (City). An interesting locomotive lying derelict at Melton Constable is *Vici*, a 0-4-0ST, built by Hudswell, Clarke, in 1880 (Works No. 192) used in constructing the line.—[R. W. FITZJOHN.]

An unusual working occurred during last summer, when a Sunday half-day excursion ran from King's Lynn to Matlock in four parts. These were all drawn by M. and G.N. rebuilt " C " class locomotives, Nos. 51, 52, 54 and 55. They were manned by M. and G.N. crews to Nottingham, where they were taken over by L.M.S. crews to Rowsley (where the old coaches were stabled) and back.—[A. M. WELLS.]

## Mersey Railway.

On a visit to Rock Ferry on September 29, I noted No. 2 of the old Mersey steam locomotives at Birkenhead (Central) station, on a side line ; it is of the 4-4-0T Metropolitan type, and retains the brown livery of the old Mersey Railway.—[R. DYSON.]

## Metropolitan District Railway.

It is not strictly true that No. 34 is " the sole remaining steam engine in service." There is also No. 35, a 4-4-0T of similar type, employed on ballast trains.—[F. J. TABOR.]

Letters have also been received from " Camden," G. W. Wright, S. H. Mould, " S.C.P.," " 2575 ' Galopin,' " J. L. Mawhood, P. S. Evetts, " L.Y. 4-6-0," F. W. Johnson, S. Lucas, S. W. Baker, C. Macdonald and R. Gray.

In some cases information duplicates that already given. Others letters have been read with interest, though they include items principally of local interest or they cannot be utilised in this section for lack of space and other reasons.

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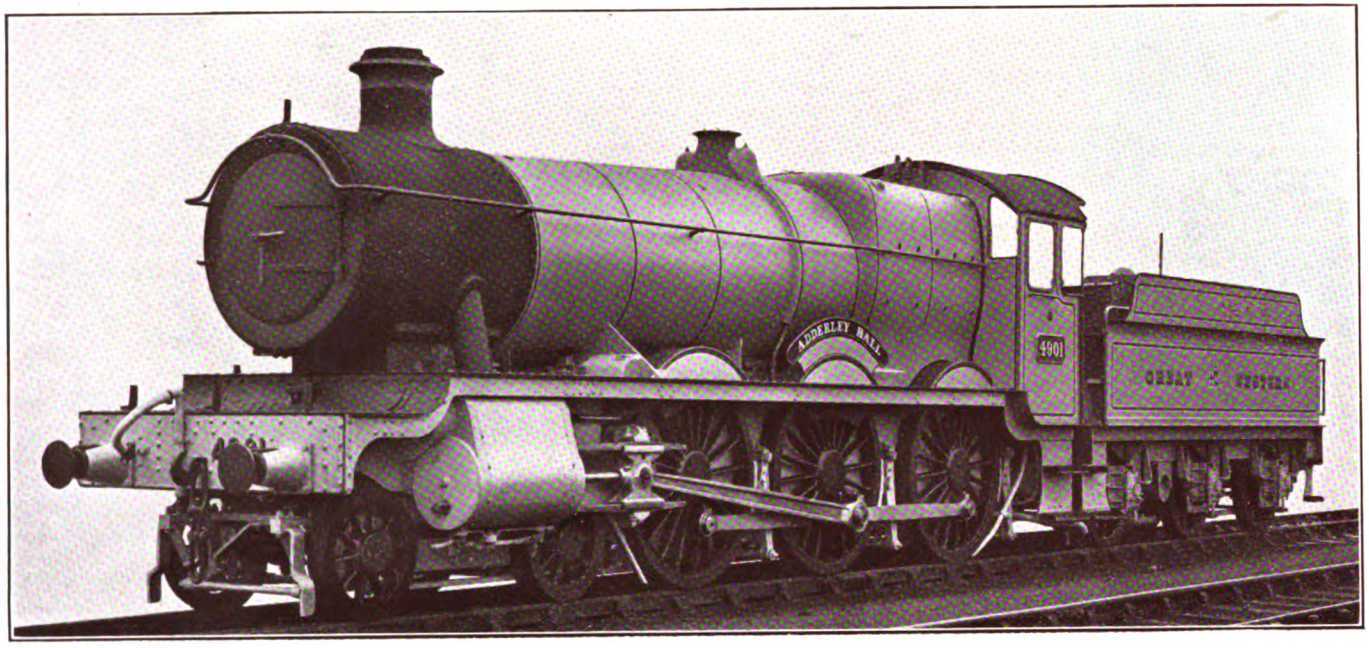


## NEW 4-6-0 MIXED-TRAFFIC LOCOMOTIVE, GREAT WESTERN RAILWAY.

### Mr. C. B. COLLETT, O.B.E., Chief Mechanical Engineer.

**Cylinders, 18½ ins. × 30 ins. Coupled Wheels, 6 ft. diam. Bogie Wheels, 3 ft. diam.**
**Heating Surface, 2,104 sq. ft. Grate area, 27·07 sq. ft. Steam Pressure : 225 lbs. per sq. in.**
**Weight in working order : Engine, 75 tons ; Engine and Tender, 115 tons.**

**These engines correspond generally with No. 2925 "Saint Martin" (now No. 4900), as rebuilt with 6 ft. coupled wheels, and constitute the new "Hall" class, of which 80 are to be constructed.**

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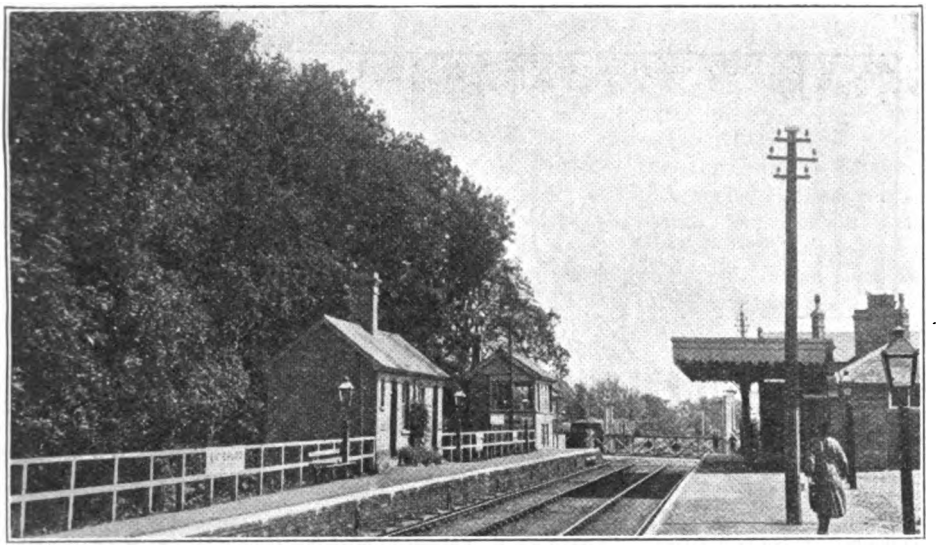

NARBOROUGH STATION.

# The Norfolk Lines of the London and North Eastern Railway.

*(Photographs by the Author.)*

By J. F. GAIRNS, M.Inst.T., M.I.Loco.E.

As the largest of the East Anglian counties, Norfolk naturally includes a considerable proportion of the mileage of the Great Eastern section of what is now the London & North Eastern Railway. Moreover, the greater part was constructed comparatively early, mainly due to the Eastern Counties Railway policy in the 'fifties and 'sixties of encouraging the construction of local railways, thereby causing much heartburning in the attempt to justify construction expenditure by traffic receipts on lines many of which really required years of development before they could be expected to pay their way, and resulting in many stormy episodes at Great Eastern Railway shareholders' meetings in those days. Fortunately, most of these sections now, at least, cover their expenses, or would do so under normal conditions, and play their part in providing traffic for and completing the network of rail facilities by which Norfolk is now so well served, while many of these lines have in later days become most important.

Before dealing with those lines which are exclusively London & North Eastern, it is necessary first to explain the position as regards the only "foreign" element involved, the Midland & Great Northern Joint Railway, and the Norfolk & Suffolk Joint Committee, though in both the London & North Eastern has important joint interests. The Midland & Great Northern Joint line crosses the county from east of King's Lynn to Melton Constable, with branches thence to Cromer, Yarmouth and Norwich. From Yarmouth (Beach) there is a further branch, used by trains for Lowestoft, and this is the Midland & Great Northern Joint until Breydon Water is crossed by the well-known viaduct (with swing-bridge section), thence connecting with the London & North Eastern branch from Yarmouth (South Town), both routes continuing as part of the Norfolk & Suffolk Joint Committee's lines. This committee is jointly constituted from the London & North Eastern, and the Midland & Great Northern Joint Railways, so that the L.N.E.R. is a party to



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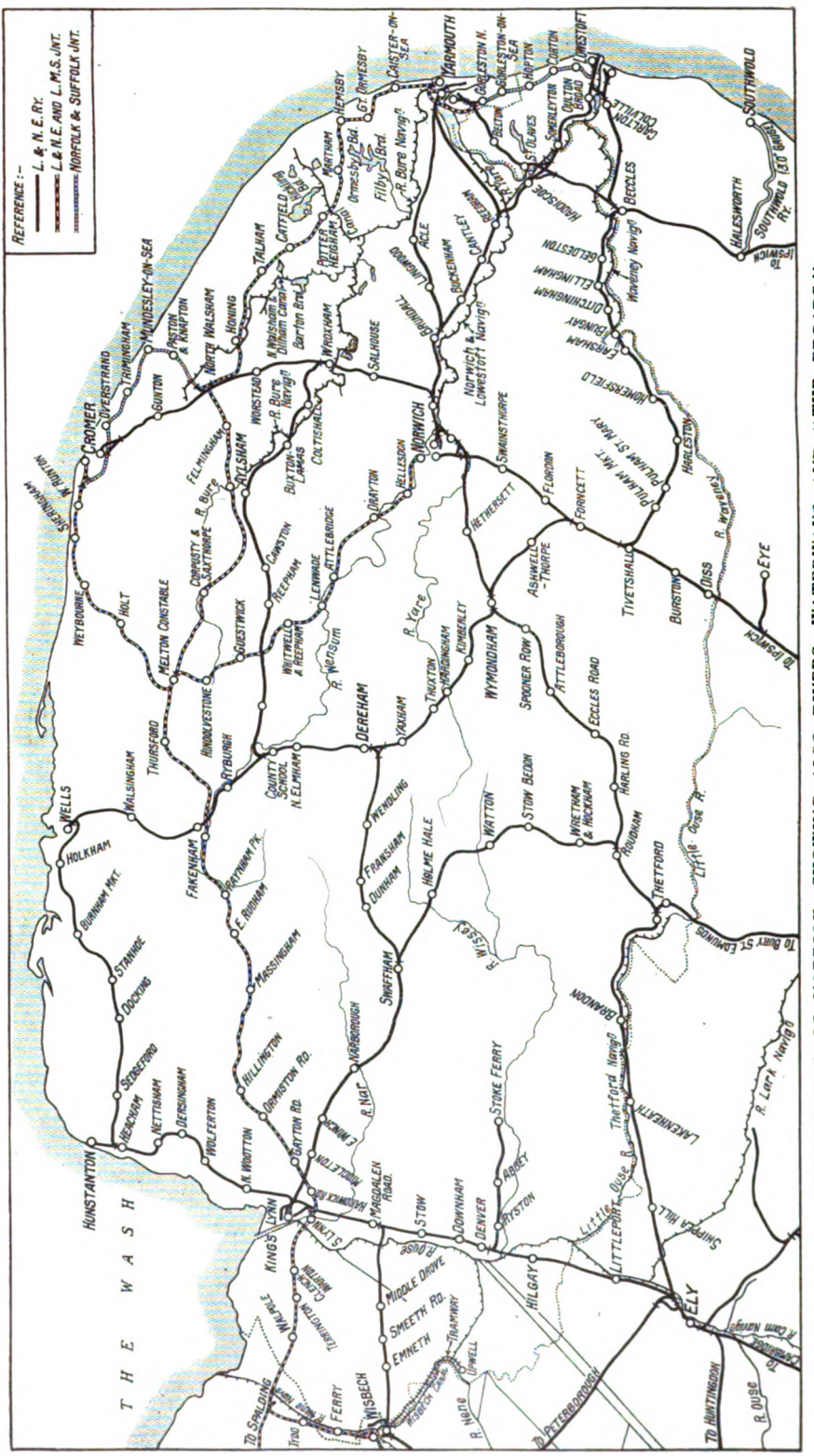
REFERENCE:-
L. & N.E. Ry.
L. & N.E. AND L.M.S. JNT.
NORFOLK & SUFFOLK JNT.
THE WASH
HUNSTANTON
HEACHAM
SEDGEFORD
DOCKING
STANHOE
BURNHAM MKT.
HOLKHAM
WELLS
NETTLETON
WOLFERTON
DERSINGHAM
R. NAR
KING'S LYNN
MIDDLE DRIVE
SMEETH RD.
EMNETH
WISBECH
TO SPALDING
FERRY
MAGDALEN ROAD
STOW
DOWNHAM
DENVER
ABBEY
STOKE FERRY
HILGAY
LITTLEPORT
ELY
TO PETERBOROUGH
TO HUNTINGDON
R. OUSE
SHIPPEA HILL
LAKENHEATH
BRANDON
THETFORD
TO BURY ST. EDMUNDS
HOCKWOLD
WATTON
HOLME HALE
FRANSHAM
DUNHAM
SWAFFHAM
WENDLING
DEREHAM
YAXHAM
TAVERHAM
KIMBERLEY
WYMONDHAM
SPOONER ROW
ATTLEBOROUGH
ECCLES ROAD
WRETTHAM & HARLING RD.
HARLING RD.
HOUGHAM
TIVETSHALL
BURSTON
DISS
EYE
TO IPSWICH
FORNCETT
FLORDON
HETHERSETT
SAWTHORPE
NORWICH
HELLESDON
DRAYTON
ATTLEBRIDGE
LENWADE
COLTISHALL
BUTTON-LABBAS
REEPHAM
COSTON
WHITWELL & REEPHAM
COUNTY SCHOOL
N. ELMHAM
R. WENSUM
RYBURGH
HINDOLVESTONE
GUESTWICK
MELTON CONSTABLE
THURSFORD
FAKENHAM
RAYNHAM PK.
E. BECKHAM
MASSINGHAM
WILLINGTON
DOWNHAM RD.
SALHOUSE
WROXHAM
WORSTEAD
NORTH WALSHAM
HONING
BARTON WALSHAM
ASTON & KNAPTON
GUNTON
MUNDESLEY-ON-SEA
CROMER
OVERSTRAND
TRIMINGHAM
SHERINGHAM
WEYBOURNE
HOLT
AYLSHAM
FELMINGHAM
CORPUSTY & SAXTHORPE
R. BURE
R. BURE Navign.
N. Walsham & Dilham Canal
Barton End
TALIHAM
CATFIELD
HONING
MARTHAM
PITTER-NEIGHAM
Ormesby Bdg.
Ormesby Bdg.
HEMSBY
G. YARMOUTH
CAISTER-ON-SEA
Filby Bdg.
R. Bure Navign.
ACLE
BRAMERTON
THURNE
BECCLES
HADISCOE
GELDESTON
OULTON BROAD
OULTON
SOUTHWOLD
HALESWORTH
SOUTHWOLD RY.
TO IPSWICH
CARLTON COLVILLE
LOWESTOFT
GORLESTON-ON-SEA
GORLESTON N.
HOPTON
STOLAVES
BELTON
ROLLESBY
MARTHAM
CANTLEY
BRUNDALL
BRAYDESTON
POLLHAM MKT.
HARLESTON
R. WAVENEY
HOMERSFIELD
FRESHAM
DITCHINGHAM
Waveney Navign.
NORWICH & LOWESTOFT Navign.
R. Yare
R. Lark Navign.
Little Ouse R.
Thetford Navign.
R. Nene
Tramway
Tramway
Wisbech Canal
Tidal
Tidal
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this Committee through both the late Great Eastern and Great Northern Railways. For practical purposes, however, this part of the Norfolk & Suffolk Joint Committee's lines is in Suffolk and, therefore, outside our present subject. There is, however, a further section contributed by the Committee which is exclusively in Norfolk—the route from North Walsham to Cromer Beach, including the connection by which Great Eastern section trains transfer their through sections for Sheringham from and to direct Cromer trains. These joint interests are shared with the L.M.S.R. as successor to the late Midland Railway, so that the L.N.E.R. is a-half or two-thirds partner. Otherwise, however, all lines in Norfolk came into the L.N.E.R. from the late Great Eastern Railway, and it is with these that this article is mainly concerned.

North of Ely the county boundary is crossed about half-way between Littleport and Hilgay, in the King's Lynn direction, while on the Norwich line, after cutting across a corner where Norfolk, Suffolk and the Isle of Ely meet, the railway skirts the boundary, first on the Suffolk side and then from about a mile west of Brandon on the Norfolk side. The remainder of the route is in Norfolk, as also all lines north of the main line, and all branches east of King's Lynn. West of King's Lynn, Wisbech is just across the Isle of Ely border, while the Wisbech & Upwell Tramway is virtually on the frontier throughout its length. The Colchester main line enters Norfolk just south of Diss, while the Waveney Valley line is mainly in Norfolk, though it crosses an outlying part of Suffolk at Bungay, and to reach Beccles passes again into Suffolk. The Yarmouth line from Beccles is in Norfolk between the swing bridges at Beccles and St. Olave's, but the South Town station at Yarmouth is in Suffolk. Most of the Norwich–Lowestoft line is in Norfolk, but Suffolk is entered near Somerleyton. The Mildenhall branch from Cambridge is in Norfolk, north of Fordham Junction. Otherwise all the railways of this area are contained within the boundaries of the County of Norfolk.

The earliest line in Norfolk was the Yarmouth & Norwich, opened May 1, 1844, and this was first connected with London *via* Cambridge and Ely, the Norwich & Brandon Railway completing the through route as from July 30, 1845. The Wymondham & Dereham line was opened in 1846, and the Ely–King's Lynn line in October, 1847, while the Dereham & King's Lynn section was brought into use in September, 1848. Meanwhile, the Eastern Counties line from Ipswich was extended from Haughley to Norwich (Victoria) on November 7, 1849. The Reedham–Lowestoft line from the Yarmouth & Norwich Railway was opened on May 3, 1847. On February 1, 1848, the Wisbech & Magdalen Road line was added. Other sections completed prior to the formation of the Great Eastern Railway in 1862 were: Tivershall to Harleston, December 1, 1855; Dereham and Wells, December, 1857; Harleston to Bungay, October 2, 1860; and the East Suffolk line completed from Ipswich to Beccles and thence to Yarmouth and Lowestoft, June 1, 1859. In October, 1862, the King's Lynn–Hunstanton line was opened and other sections added as follows: Bungay and Beccles, March 1, 1863; Heacham and Wells, August, 1866; Thetford and Swaffham, September, 1875; Norwich and Cromer, opened in sections, October, 1874, to March, 1877; Thetford and Bury St. Edmunds, March, 1876; Wymondham and Forncett, May, 1881; Wroxham and County School, in sections between July, 1879, and November, 1884; Stoke Ferry branch, August, 1882; Brundall and Yarmouth, *via* Acle, 1883; Cambridge and Mildenhall line (which just crosses into Norfolk) opened April, 1885.

More recently, the Yarmouth and Lowestoft direct line (Norfolk and Suffolk Joint Committee), joint with the Midland and Great Northern Joint Railway, was completed July, 1903; while the other section now operated by the Norfolk and Suffolk Joint Committee, was opened from North Walsham to Mundesley-on-Sea in July, 1898, and extended to Cromer in March, 1907.

Apart, however, from their historic interest, there are many special features of these lines which justify attention on this occasion, and those lines which centre upon Norwich may first be considered.

The old terminus at Norwich (Victoria) has for several years been reserved for goods traffic only, all passenger trains using Norwich (Thorpe) station. The latter station dates from 1886. In this connection it may be pointed out that



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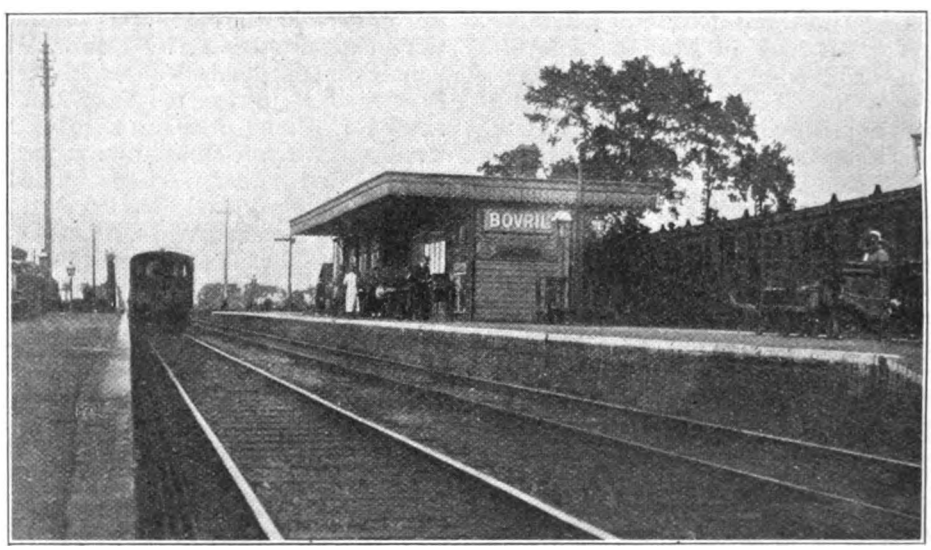
provision was made in the G.E.R. Act, 1862, that the Victoria station at Norwich should be kept open for passenger traffic, with a proviso that it might be closed with the sanction of the Mayor and Corporation of the city. Many years ago, however, the G.E.R. Company, realising the advantage to be gained by concentrating passenger traffic at one station in Norwich, asked the Corporation to sanction the closing of Victoria station, but this was declined. The corporation were again approached in 1914. After lengthy negotiations the authorities agreed, and it was actually closed for passenger traffic in 1916. The booking hall and offices, which still stand, were formerly used as a circus, and the following appeared in the *Norwich Mercury*, July 11, 1914, when negotiations were in progress :—

> Some of the older citizens will recall memories of the days, not so very distant either, when amusement gardens and the present glazed structure made this quarter of the city one of the most popular resorts of the day. The Ranelagh Gardens and the Pantheon had a long spell of popularity in the early years of the nineteenth century. The gardens have, of course, long since vanished, but the Pantheon remains to remind the present generation of the glories of the old days. It is curious to read the theatrical comment in its time of prosperity that the Pantheon "is a handsome building, and when lighted as it ought to be, and filled with jovial faces presents an animated scene." The property passed into the hands of the railway contractors when, in 1849, the Eastern Union Railway acquired it for the purpose of their Norwich terminus.

Communication between the lines north and south of the Yare is made by the Trowse swing bridge, the opening span of which is now electrically operated. The passage of this bridge is necessarily at reduced speed, though the limit of 25 m.p.h. is not severe in view of the close proximity to the necessarily slow-speed curves to and from Thorpe station or the Wensum curve, also requiring a reduced speed. The situation is not, however, complicated by single-line working as in the case of several other lines in Norfolk, notably on the Beccles–Yarmouth (South Town) section, where the Waveney is crossed by swing bridges at Beccles and St. Olave's. These latter bridges have now been reconstructed, so that conditions are very much better than they were.




**TIVETSHALL STATION.**

Branch train on back platform line.

Trowse may be described as a suburb of Norwich. The village itself lies east of the line, but J. & J. Colman's mustard, starch, cornflour, &c., works at Carrow are to the west of the railway and within the city boundary of Norwich, having a siding connection from Trowse yard. The goods traffic at Trowse, other than

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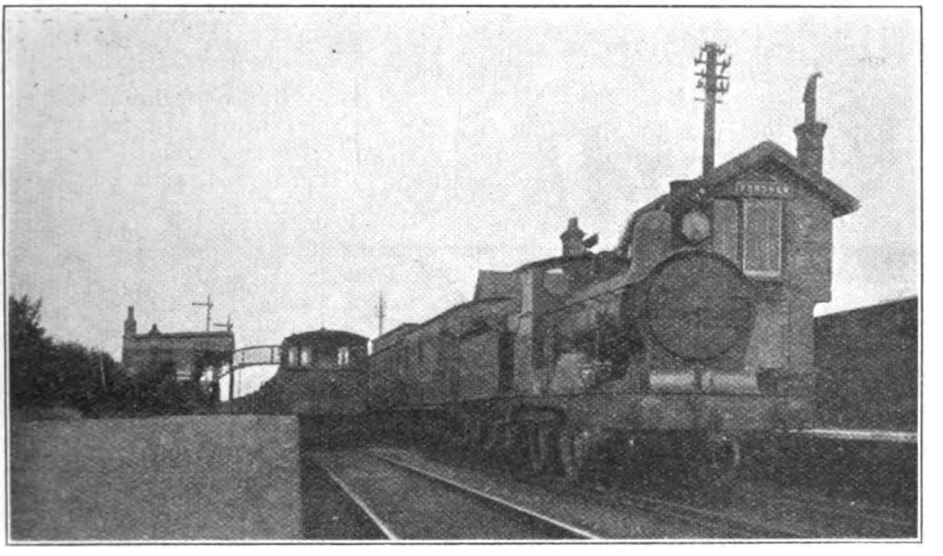
that of Messrs. Colman's—which, of course, is very heavy—is relatively small, but the inwards store and outwards fat cattle passing through the pens at Trowse is extremely heavy, the number of head shown at Norwich being probably as heavy as at any other place in England. Several important expresses stop there, and alongside the passenger station is an extensive cattle depot. After crossing the swing bridge, Wensum curve diverges at Swing Bridge Junction, providing a direct route to the Norwich and Yarmouth line, joined at Wensum Junction, enabling passenger trains, such as the Norfolk Coast express on its summer schedules, and specials and goods trains, to avoid Norwich (Thorpe), which is terminal. Whether proceeding into Thorpe station or traversing Wensum curve, the journey is associated with goods lines and extensive sidings, while adjacent to the curve are sidings. Alongside the direct route to Thorpe station are the goods sidings, engine sheds, and locomotive repair shops, and right into the terminus there are numerous sidings in connection with the goods depot, as also carriage sidings.

Continuing south-west of Norwich, there is nothing calling for special remark until Wymondham station is reached, serving the country town of that name. There is a certain amount of roadstone and general traffic, several sidings serving roadstone quarries, and this station is also important as a traffic centre, as it is the junction for the branch from Forncett, on the Ipswich–Norwich main line, and for the Dereham branch. The former, double-track, joins the Ipswich line 33 chains north of Forncett station. It provides a valuable link between the two main routes, avoiding the necessity for continuing to Trowse or Norwich to make connections between trains.

In several cases main line and express trains from or to London and Ipswich call at Forncett, so that passengers can change into a local train to or from Wymondham, thereby making connections with Dereham and other trains, whose times will not allow of connections *via* Trowse or Norwich. During the great floods of 1912, when the main line was temporarily severed near Flordon, trains to and from Ipswich used the Forncett–Wymondham line, reversing at the latter station, and the writer has recollections of being conveyed this way by the Norfolk Coast Express, which was thus reversed at Wymondham in order to make its otherwise non-stop journey between Liverpool Street and North Walsham. At Wymondham, a busy station, there is an island on the up side, though the back line is not generally used by passenger



**FORDHAM JUNCTION.**



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trains. The Dereham branch diverges immediately on leaving the station.

The old Yarmouth and Norwich Railway follows the course of the Yare very closely for a considerable distance; in fact, for virtually the whole of its length and most of the way a train journey gives interesting views of the waterways of the district. From Wensum Junction to Whitlingham Junction the railway is almost on the river side, with two low bridges by which a loop of the River Yare is crossed. On the up side of the line there is an artificial "cut" in order that vessels may not require to pass under these bridges and round the loop. During the summer months, in fact, there is much of interest, the river being dotted with small pleasure craft, houseboats, &c., all the way from Thorpe village to Brundall and beyond. This is, indeed, a particularly interesting district, though, except for a few small ones, the Broads proper lie further north, within the area bounded by Stalham, Wroxham, Ade, and Yarmouth.

*(To be continued.)*

## TEN MILES FROM A RAILWAY.

THE map reproduced, from an article on "The Civilizing Rails," by Mark Jefferson, Professor of Geography, Michigan State Normal College, appearing in *Economic Geography*, is notable because all areas within 10 miles of a railway are shown white, the remainder being black.

Prof. Jefferson may also be quoted as follows:—

"Railway transportation is the agency that for the century past has done more than any other single one of man's inventions to transform human life, especially in the way of pushing backward people forward and lifting submerged classes. . . . Mobility transforms and ennobles peoples. . . . The United States has been aptly called a railway-created country. . . . It is not that the railways happened to come along just as the country was being settled. The country did get settled then because the railway was available to do the work. Without the rails there would be no such country to-day. Settlement would have crept slowly along the rivers; numbers would still be small and wealth far less. Canals would be more numerous, and fewer of those once built would have fallen into decay. All the waterways would be in use, but the total movement would be, by our present lights, insignificant. The railways made the United States, and the present generation has its whole life tied up with the effects of railways."

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# The New Piccadilly Circus Station.

ON Monday, December 10, a distinguished company of guests assembled for the ceremonial opening by the Mayor of Westminster (Major Vivian B. Rogers, D.S.O., M.C., J.P.) of the new Piccadilly Circus station, which Lord Ashfield legitimately claimed to be the finest and most up-to-date underground station in the world. This undertaking has represented one of the most difficult engineering achievements ever carried out, and, in this connection, Mr. H. H. Dalrymple Hay Consulting Engineer, Mr. Arthur R. Cooper, Chief Engineer to the "Underground" Companies, and the contractors, R. Mowlem & Co. Ltd., are much to be congratulated on carrying this complicated work to fruition so expeditiously and without serious accident to men or material. Yet the whole of this work was done from a small island site in the middle of the Circus, through the medium of one service shaft, without involving interference with surface road movements or low-level tube railway traffic. Further, its completion gives a much-needed public facility, though at the expense of the "Underground" Companies, in that the "ambulatory" which encircles the booking hall becomes a means whereby pedestrians can cross the Circus in any direction, and has been laid out with that purpose in view, as well as to meet the needs of rail passengers.

The completion of this new station marks not only an important improvement in "Underground" facilities, but an important addition to the public amenities of Westminster, as the scheme includes a system of public subways beneath the traffic-congested Circus and a special subway for the pipes and cables of public-service undertakings. The task of construction, which has occupied about four years, is a noteworthy engineering achievement, the more so as it was accomplished without interference to surface traffic or disturbance to "Underground" services. The station itself is an interesting departure in railway station architecture and is notable for various innovations in railway practice. The entire cost of the new works—over £500,000—is being borne by the "Underground" companies.

The original station at Piccadilly Circus dates from 1906, when the "Bakerloo" and the "Piccadilly" tubes, which cross each other here, were opened. It was designed to serve both lines, and in the light of the traffic of the period the station seemed adequate to meet requirements for many years to come. The development of the Piccadilly Circus district (development stimulated by the tubes) was so rapid, however, that even before the war the pressure of increasing traffic taxed the capacity of the station.

Various improvements were effected. Structural peculiarities and other exigencies, however, debarred the installation of escalators and the provision of a really commodious booking-hall, and attention was consequently given to the construction of a new station as the only satisfactory scheme. It was decided to follow the plan that had been adopted at the Bank and to build a station beneath the open space of the Circus, west of the existing station.

When first opened, Piccadilly Circus station had to deal with an annual traffic of 1½ million passengers; to-day the figure is 25 millions, or an average yearly increase of over one million passengers. About 1,600 trains now serve this station daily.

To appreciate the difficulties that confronted the engineer and which have been successfully surmounted at Piccadilly Circus, it is necessary to understand fully the peculiarities of the site and the respective situations of the two railways The two railways lie at different levels. The "Piccadilly" tube is 102 ft. below the surface: the "Bakerloo" tube was the first of the two lines to be constructed and is 86 ft. below the surface.

The task to be accomplished comprised the construction of a spacious booking-hall only a few feet below the roadways. with subways radiating from it to the various streets around the Circus; a lower hall, 42 ft. beneath the booking-hall and connected with it by five escalators; and between the lower hall and the two railways below it—at different levels! —further flights of escalators and the stairways and passages to connect them with the platforms. Certain short



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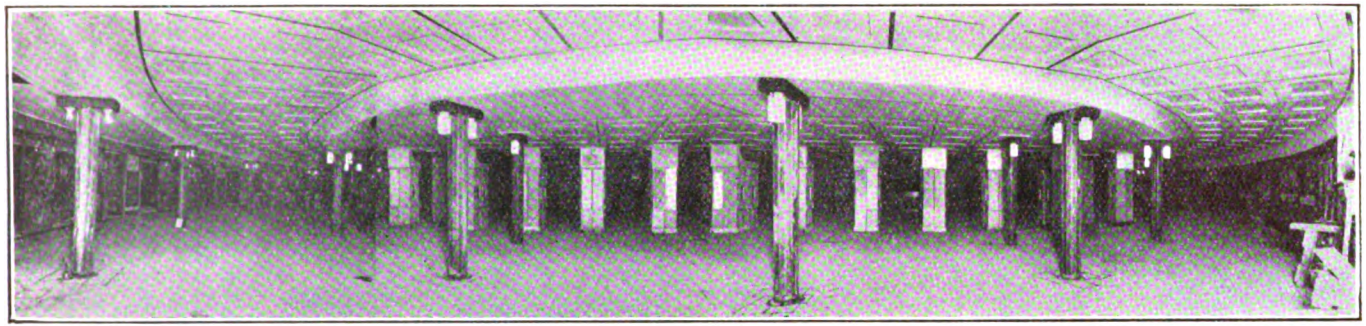

VIEW OF CIRCULATING AREA, SHOWING SUPPORTING COLUMNS, TICKET MACHINES. &c.

*Photos.*] BATTERY OF TICKET MACHINES.

PREPARING SHOW CASES. [*Topical.*

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passages had to be formed to improve the interchange traffic connections of the two railways.

Practically all of this involved task had to be conducted without opening the roadways, without interfering with traffic, and without disturbing the services supplied by the gas, electric light, telephone, water, and hydraulic-power mains running in all directions immediately beneath the roadways. To complicate the problem further, a large sewer passed right through the site of the booking-hall.

Construction began in February, 1925, with the sinking of the service shaft from which the excavation was to be carried out. The only site available was the small island on which the Shaftesbury Memorial stood, and this had of necessity to be removed. On the site of the memorial a shaft 18 ft. in diameter and 92 ft. in depth was sunk, and from this the construction of the new works, with the exception of the booking-hall, has been carried out. The shaft has been used also for the passage of material, plant, &c., to and from the works; for bringing spoil up to the surface—during excavation a thousand tons of clay were brought up monthly—and in it is now the emergency staircase of the new station. The island on which the shaft was sunk represents probably the smallest area that has ever been used for this purpose, which means that the space available for the erection of gantries and gear and for the storage of material, &c., was correspondingly limited.

This pipe subway, as it is termed, is remarkable in being the first of the type to be constructed in this country, with the qualification that the first tube ever constructed—the old Tower Subway, the prototype of all iron-lined tunnels—is now adapted to a similar purpose. The pipe subway at Piccadilly Circus is 12 ft. in diameter, or $3\frac{3}{4}$ in. larger than the running-tunnels of the Tube railways. It is of similar design, being of circular section and lined with cast-iron segments cables and pipes alike are thus readily accessible, and henceforth any work concerned with them can be conducted without the former necessity of opening roadways.

The construction of the booking-hall was achieved by means of a series of burrowings, until the ground beneath the Circus became a labyrinth of steel-roofed and steel-supported tunnels, which, eventually, through the removal of the intervening walls of earth, became merged into an elliptical chamber 155 ft. by 144 ft. in area and 9 ft. in height, only a few feet below the surface. Each of the four columns erected in the central portion of the hall is capable of supporting a weight of 309 tons; whilst the fifty columns erected in a double row around the perimeter of the hall are capable of supporting individual loads ranging from 78 to 150 tons. The steelwork that supports the roadways above the booking-hall has been likened to a breastplate. Before the work of installing began, the breastplate was fitted together in a yard at Josiah Westwood & Co.'s works, and every piece numbered in conformity with its position shown on the engineer's plan.

The six subways that radiate from the booking-hall were excavated by methods similar to those adopted in constructing the booking-hall. The subways connect the booking-hall with the following points around the Circus: Swan & Edgar's corner (two entrances), the County Fire Office corner of Regent Street, the Pavilion corner of Shaftesbury Avenue, the old "Underground" station, and each side of Lower Regent Street. A subway has been built below the last-named street, connecting the two entrances here and thus providing a direct crossing beneath this congested "one-way traffic" thoroughfare. Through the medium of the ambulatory encircling the booking-hall the subways as a whole afford a means of communication to and from all sides of the Circus.

Owing to the depth of the platforms below the surface it was necessary to divide the escalators into upper and lower flights, the former connecting with the lower hall, whence the latter strike off in a reverse direction and terminate close to the platforms of the respective tube that they serve. The lower hall, in the mid-level of the station, consists of four arched bays, and is 90 ft. long by 32 ft. wide.

In all there are 11 escalators, the greatest number at any "Underground" station; and the five of the upper flights are the largest number yet installed side by side.

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*Photopress.*] THE MAYOR OF WESTMINSTER, LORD ASHFIELD, AND OTHERS ATTENDING THE OPENING CEREMONY.

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All the escalators are adapted to being worked in either direction. The upper flights of escalators comprise two and three, respectively, in parallel tunnels running down from the north side of the booking-hall. The inclined tunnels, which are 60 ft. long, were driven from the booking-hall. The one containing the two escalators is 16 ft. 4 in. in diam.; the one containing the three is 22 ft. 4 in. in diam.

The lower flights comprise two triple sets, to left and right, respectively, of the lower hall. The set on the left, which connect with the "Piccadilly" tube, are in an inclined tunnel 63 ft. in length, and have a fall of 39 ft.; whilst the set on the right, connecting with the "Bakerloo" tube, are in a tunnel 26 ft. in length and have a fall of 21 ft. The diameter of the tunnels is 22 ft. 4 in. in each case.

All the escalators are of the Otis Elevator Company's improved cleat-comb type, with a speed of 100 ft. per minute. Each escalator of the upper flights is operated by a 45-H.P. electric motor; those of the lower flights by 35-H.P. motors. These motors are contained in chambers in the upper part of the escalators. By the depression of a button a moving escalator can be at once brought to a standstill in cases of emergency.

The space between the two rows of columns that are the dominating architectural and structural feature of the booking-hall has been adapted to the purpose of an ambulatory. This passes right around the hall, enclosing the head-wall of the escalators and an inner circulating area, and is open to both passengers to and from the "Underground" and the general public using the subways to cross the Circus. The columns are covered with red scagiola, relieved by narrow vertical fillets of bronze, and have bronze bases and caps. From the cap of each column two lights, enclosed by opal cylindrical shades, are suspended. The columns in the central portion of the hall have been similarly treated.

Above the escalators, on the inner sides of the head-wall, are paintings in oil by Mr. Stephen Bone. The central compartment contains a map of the world, showing the British Empire in a distinctive colour, with the names of the capitals of the various Dominions and Colonies inscribed. Flanking the map are to be smaller panels with pictures representing the activities of the "Underground" in the sphere of urban and suburban transport.

The lower hall has the walls tiled in a groundwork of silver-grey with mauvre borders, divided into poster-panels edged with blue. The upper parts of the walls and the arches are in white matt distemper. Lighting is by concealed lamps.

Lighting is by means of bronze pedestal lamps, set at intervals along the decking of the balustrades. Special shades direct the light upwards and cause it to be diffused with uniform softness so that there is no glare.

Apart from the ever-open access they provide to and from the platforms, the escalators, compared with the lifts of the old station, have the further advantage of abutting in close proximity to the platforms, which are situated directly below the Circus. Owing to the old station being in line with the building frontage at the eastern extremity of Piccadilly, a walk of some little distance was necessary in passing between lifts and platforms. The time occupied by passengers in passing from street to platform, and *vice versa*, at the new station will be equal to a saving of 2½ minutes compared with the time taken at the old station.

The staircase heads are enclosed by bronze railings of artistic design, surmounted by illuminated signs bearing the words, "Underground: Public Subway." At the foot of the staircases connecting with the street are collapsible gates. The subways are open throughout the hours of traffic on the "Underground," *i.e.*, from 5.30 a.m. till 12.30 a.m. on week-days, and from 8.0 a.m. till 11.30 p.m. on Sundays.

In conformity with modern "Underground" practice, automatic machines will play an important part in the booking arrangements at the new station. For the present, the machines are of the standard electric type, delivering pre-printed tickets, but these will be replaced by a battery of special A.E.G. ticket printing and delivering machines.

The first installation comprises 26 machines, arranged so that they form portals to the passenger circulating area, or inner ring, of the booking-hall. They

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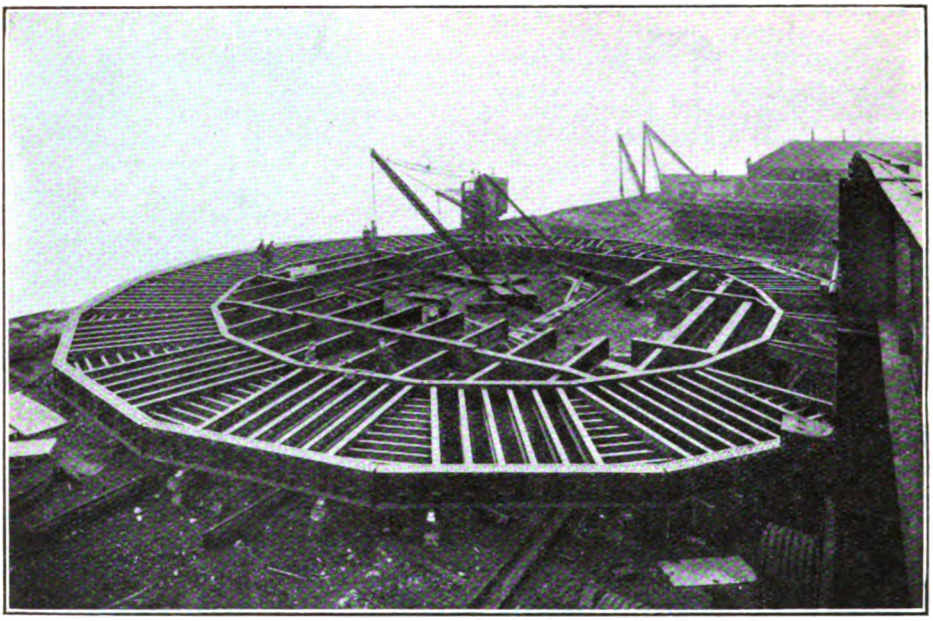
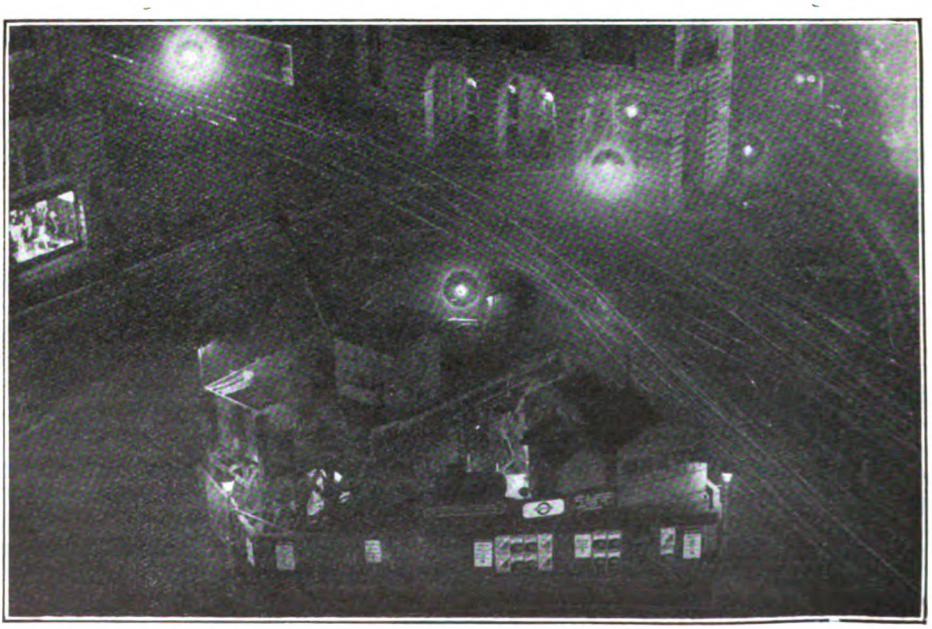


"BREAST PLATE" FOR ROOF CONSTRUCTION AS SET OUT IN BUILDERS' YARD.



THE ISLAND SITE FROM WHICH ALL WORK WAS DONE.

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issue tickets ranging from 1d. to 6d. in denominations, and consist of two machines for 1d. tickets, two for 1½d., eight for 2d., eight for 3d., four for 4d., one for 5d., and one for 6d. Tickets of denominations above 6d., season tickets, and other kinds not adapted to machine delivery will be obtained at the auxiliary booking office, which will be equipped with three A.E.G. ticket-printing and issuing machines. For the convenience of passengers using the automatic machines a change-giving kiosk is provided. Near the escalators is an inquiry kiosk.

A set of train-recording clocks is provided, on the dials of which are automatically recorded the working of the services of the six railways of the "Underground." By means of electrical connections between the clocks and the track at certain stations, the passing of a train is recorded on the dial by an inked pointer. The regularity of the strokes indicates that the various services are working normally. The clocks record the passage of trains at the following points on the "Underground" system: Piccadilly Circus (Bakerloo Line), Leicester Square Piccadilly and the Hampstead lines), Tottenham Court Road (Central London Railway) Kennington (City Line), and St. James's Park (District Railway).

## THE PRINCE OF WALES' JOURNEY FROM FOLKESTONE TO LONDON.

THE following particulars were given in the *Southern Railway Magazine*:—

| Distance. | | Stations. | Booked Skeleton Schedule. | | | Actual Running. | | | Average Speed | Service Checks |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Arr. | Pass | Dep. | Arr. | Pass | Dep. | Miles per hour. | Permanent and Temporary. |
| Mls. | Chs. | | | p.m. | | | p.m. | | | |
| | | Folkestone H. .. | — | | 0 | — | | 8.48 | | |
| 0 | 0 | Folkestone J. .. | 0.4 | | 0.7 | 8.52 | | 8.56 | 43.90 | |
| 5 | 39 | Sandling J. .. | | 0.17 | | | 9.3½ | | | |
| 14 | 65 | Ashford .. .. | | 0.27 | | | 9.12½ | | 62.16 | 15 m.p.h. |
| 36 | 9 | Paddock Wood .. | | 0.48 | | | 9.31½ | | 67.26 | (Ashford) |
| 41 | 30 | Tonbridge .. .. | | 0.53 | | | 9.37 | | 57.40 | 20 m.p.h. |
| | | | | | | | | | 47.05 | Tonbridge Station) |
| 48 | 66 | Sevenoaks .. .. | | 1.3 | | | 9.46½ | | | |
| 57 | 8 | Orpington .. .. | | 1.12 | | | 9.55½ | | 55.16 | 15 m.p.h. |
| 59 | 39 | Bickley J. .. .. | | 1.16 | | | 9.59¼ | | 38.20 | (Knockholt) |
| | | | | | | | | | | 40 m.p.h. |
| 68 | 6 | Herne Hill .. .. | | 1.27½ | | | 10.10½ | | 45.80 | (Shortlands to Beckenham) |
| | | | | | | | | | | 20 m.p.h. (Kent H'se) |
| | | | | | | | | | | 25 m.p.h. (Factory J.) |
| 72 | 4 | Victoria .. .. | 1.35 | | — | 10.17 | | | 36.69 | 15 m.p.h. (Victoria) |

Average speed, Folkestone Junction to Victoria, 53.37 m.p.h.
Weather, Fine. Boat arrived 8.41 p.m. Weight of train, 120 tons.
Engine No. 754A. Driver, P. J. Tucker (Dover). Fireman, A. Jenkins (Dover). Locomotive Inspector, Carpenter. Guard, Kingsland.
Stock—B.V. No. 312, 22 tons. First No. 7385, 33 tons. Car Chloria, 40 tons. B.V. No. 325, 25 tons. Total, 120 tons.

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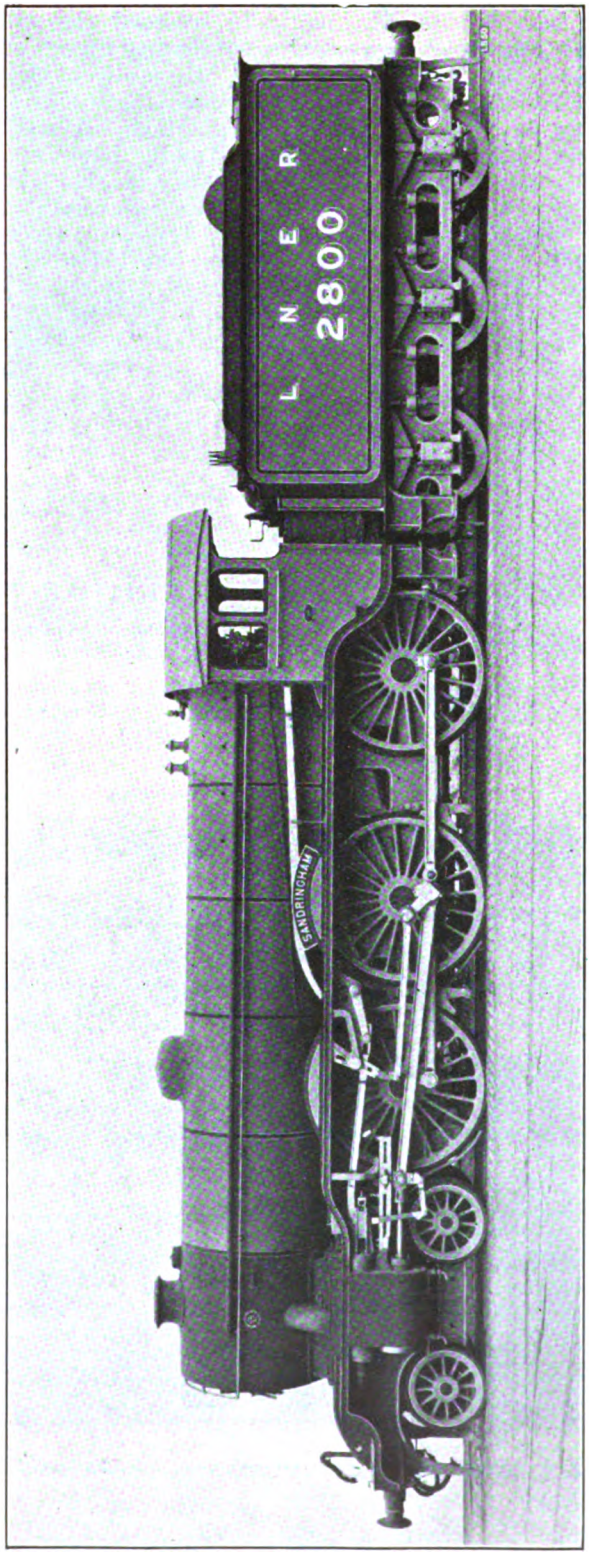


**NEW THREE-CYLINDER 4-6-0 LOCOMOTIVE, L.N.E.R.**

Designed by Mr. H. N. Gresley, C.B.E., Chief Mechanical Engineer.

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# New 4-6-0 Locomotive, L.N.E.R.

BY the courtesy of Mr. H. N. Gresley, C.B.E., Chief Mechanical Engineer, London and North Eastern Railway, we are enabled to illustrate and describe a new series of three-cylinder 4-6-0 express passenger locomotives which have been designed for service on the Great Eastern Section of the L.N.E.R. Ten of these engines have been built in the shops of the North British Locomotive Co. Ltd., at Glasgow. With the exception of ten two-cylinder 4-6-0 engines built in 1928 and conforming in general dimensions and design to the "1500" class originally constructed for the Great Eastern Railway under Mr. S. D. Holden, no new express passenger engines have been built for the Great Eastern Section since the formation of the L.N.E.R. group in 1923. Owing to considerable development in the passenger traffic on this Section, a more powerful engine than those at present in use has been rendered necessary to deal adequately with the heavy trains. The new 4-6-0 has been specially designed to meet these conditions. It has been built to the maximum axle weights permitted on the Section, having regard to the reduced hammer blow secured by the use of the three-cylinder arrangement. Another important feature which had to be borne in mind when designing the new engine was that the overall length must not exceed that of existing engines. Consequently, as will be noticed from the photograph reproduced on the opposite page, the small type tender employed on the G.E. Section has been used.

The three cylinders have a diameter of 17½ in., with 26-in. stroke. Those outside the framing drive on the second coupled axle, the drive from the inside cylinder being on the leading coupled axle. Steam is supplied to the cylinders through 8-in. diam. piston valves. Walschaerts gearing is employed for actuating the valves of the outside cylinders, the motion for the inside valve being taken from the outside mechanism in accordance with Mr. Gresley's well-known arrangement. As in the case of the "Shire" class 4-4-0 locomotives introduced towards the end of 1927, the inside valve gear is arranged behind the cylinder, which is placed well forward and the crosshead and slide bars are under the smokebox. If a separate valve gear had been required, it would necessarily have been located in a position difficult of access. The valve gear used has, consequently, greatly simplified the arrangement and has made any inside valve motion unnecessary.

The following table gives the leading dimensions of the new engine :—

| | |
|---|---|
| Type | B17. |
| Cylinders (3)— | |
| Diameter | 17½ in. |
| Stroke | 26 in. |
| Cylinder, H.P. | 1,653. |
| Piston valves— | |
| Diameter | 8 in. |
| Maximum travel | 5⅝ in. + 1/32 in. |
| Cut-off in full gear | 65 per cent. |
| Coupled wheels, diameter | 6 ft. 8 in. |
| Bogie wheels, diameter | 3 ft. 2 in. |
| Boiler working pressure | 200 lb. per sq. in. |
| Heating surface— | |
| Firebox | 168 sq. ft. |
| Small tubes, 143, 2-in. diam. | 1,048 ,, |
| Flues, 24, 5¼-in. diameter | 460 ,, |
| Total evaporative | 1,676 ,, |
| Superheater, 24 elements, 1 7/32 in. diameter | 344 ,, |
| Total heating surface | 2,020 ,, |
| Tractive effort at 85 per cent. of the boiler pressure | 25,380 lb. |
| Weight of engine in working order | 76 tons 13 cwt. |
| Weight of tender in working order | 39 tons 8 cwt. |
| Total weight of engine and tender in working order | 116 tons 1 cwt. |
| Total length of engine and tender overall | 58 ft. 4 in. |
| Tender coal capacity | 4 tons. |
| ,, water capacity | 3,700 gallons. |

The coupled wheels are 6 ft. 8 in. in diameter and the total weight on each of the two driving axles is 18 tons, with 17 tons 15 cwt. on the trailing coupled axle. Nickel chrome steel has been employed for the connecting and coupling rods, which



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are of similar design to those used on the Pacific engines. Laminated springs are employed for the coupled wheels with helical Timmis section springs for the bogies.

The boiler, which carries a working pressure of 200 lb. per sq. in., has a maximum diameter of 5 ft. 6 in. Two Ross "pop" safety valves are mounted above the firebox. With a grate area of 27·5 sq. ft. and a total heating surface of 2,020 sq. ft., the boiler horse-power is 1,230.

In working order the engine weighs 76 tons 13 cwt., of which 53 tons 15 cwt. are available for adhesion. The total weight of engine and tender in working order is 116 tons 1 cwt. The tractive effort developed at 85 per cent. of the boiler pressure is 25,380 lb., this comparing with the figure of 21,969 lb. developed by the "1500" class, the weight of which for the engine only is 63 tons.

It has been decided to name these engines after well-known country seats in the Eastern counties and, with the permission of the King, the first of the engines has been named *Sandringham*, the names of the other being :—*Holkham, Walsingham, Framlingham, Elveden, Burnham Thrope, Audley End, Blickling, Gunton* and *Quidenham*.

## A "PLATFORM" STATION ON THE L.M.S.R.

**GLENCARRON PLATFORM, "SKYE" LINE, L.M.S.R.**

This "platform" is of the type described last month in the article on "The 'Further North' Section of the L.M.S.R." The signals are operated as necessary to denote that a train is required to stop to pick up passengers.

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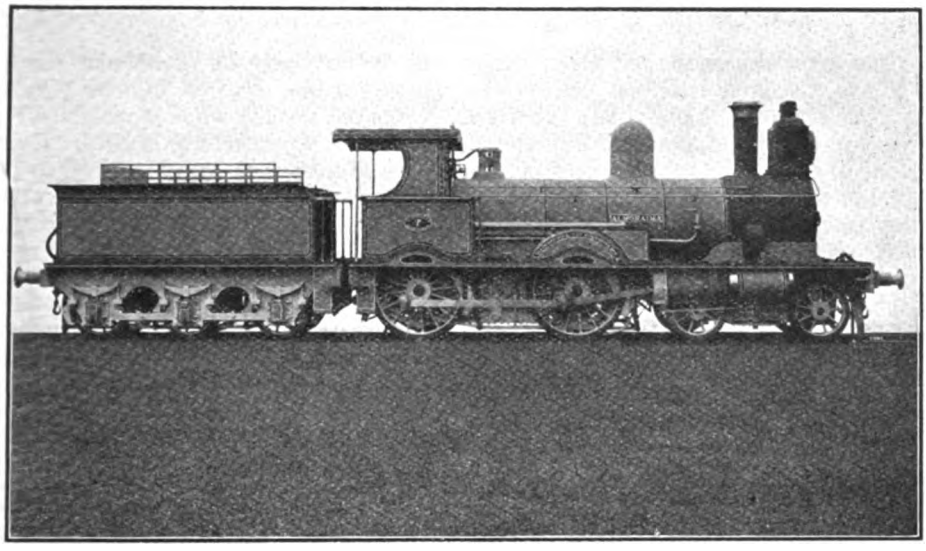

4-4-0 NO. 7, "ALMORAIMA" ANDALUSIAN (ROBADILLA-ALGECIRAS) RAILWAY.
Built by Beyer, Peacock & Co. Ltd., in 1912.

# Across Spain in a Railway Train.

By R. B. B. TOLLINGTON.

SPAIN has always been, and still is, a peculiarly attractive country to the traveller. The halo of romance which surrounds her name in fiction, unlike many other such halos, rests on a considerable basis of fact, and even in the all too short thirty-two hours required to cross her by railway, the traveller can grasp much of the attraction of the land as well as seeing much of interest to a railway enthusiast.

Algeciras to Hendaye (the French Biscayan frontier) is 853 miles: the first half of the journey—the 460 miles from Algeciras to Madrid—is run over the lines of the Andaluces and M.Z.A. (Madrid-Zaragossa-Alicante) Railways; the second half is over the lines of the Norte.

We arrived at Algeciras Puerto (the station for "Gib") at 2 o'clock one sunny January afternoon—Algeciras is the southernmost railway station on the mainland of Europe, hence the sun!—to catch the bi-weekly "rapide." Our locomotive, we discovered, was one built by Messrs. Beyer Peacock in Manchester, in 1891, very much resembling some of the old Somerset and Dorset Railway locomotives.

The illustration shows a similar locomotive built for the Andaluces railway in 1912. Leaving the Puerto Station at 2.10, we soon reached Algeciras town, where we took on board two Guardia Seville, armed with trench helmets and full modern equipment, as a safeguard against bandits. Thence the railway makes the circuit of Algeciras Bay, getting a fine last view of "Gib." The next objects of interest are the woods of Almoraima, through which the railway passes and then begins to ascend the Sierra. Quaint walled villages, crowning hilltops, are passed, reminding one of the very real and terrible danger that threatened them from the Barbary Corsairs. The hills gradually close in round the line and it enters the gorge of the Guardiaro. The line runs high up on the left side, some 150 ft. above the stream at first, threading tunnels and crossing and recrossing the river; one fine peak of the Sierra towers above the line to the West, some 2,000 ft. of sheer rock, and then at last, just before sunset, we emerge



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into the great saucer-shaped green valley of Ronda. Ronda itself is seen to the East, some 500 ft. higher, and the train crawls up to it round a curve 3 miles long.

None of old Ronda can be seen from the train, but there is a fine retrospect over the valley to the distant peaks of the Sierra, which are very beautiful in the sunset light. Ronda (723 m.) is the summit of the journey to Madrid; from it we slipped rapidly down in the twilight, seeing little beyond the interminable hedges of Prickly Pear (cactus), to Bobadilla (380 m.), the junction for Malaga, where the other half of the Madrid "rapide" is joined.

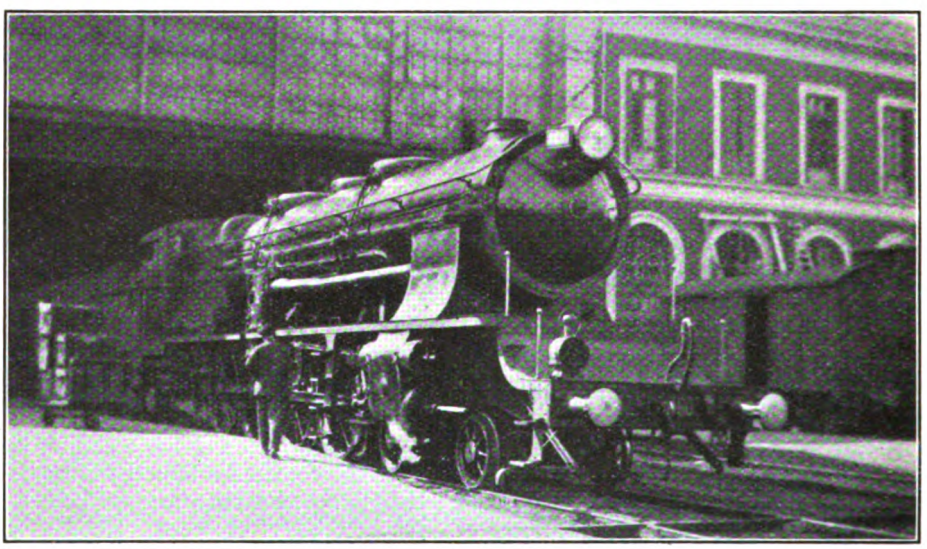

*Photo.*] [*F. D. C. Everard.*

**4-8-2 No. 4603, ON BILBAO AND HENDAYE "RAPIDE" AT MADRID.**

Bobadilla entails a 20-minute wait, and we noticed with interest the large, clumsy, but powerful-looking 4-8-0 locomotive, a type not common in Europe for "rapides" except on mountain sections—which was to take us on; we also saw several 2-4-0's of the most primitive and Stephensonian character.

After Bobadilla it was quite dark. We obtained a glimpse of the Guadalquivir at Cordova, but nothing else. And so to sleep.

The change of scenery which greets the eyes of the awakened traveller at 7.30 next morning is amazing. Instead of green Ronda and the distant Sierra, one sees a vast flat baked brown expanse of country. Few trees, no green vegetation, no water, only an occasional road, and little or no sign of human habitation. Only the distant wireless masts to remind us we are approaching Madrid. Even the Tagus, crossed at Aranjuez, fails to change the general barren aspect of the country. This scenery continues right up to Madrid, of which one gains a comprehensive view. We rumbled lazily across the miserable Manzanares, past the backs of houses for a few minutes, and so arrived at Madrid—Atocha—a small and unimpressive station.

Madrid demands a day, if only because the Algeciras-Malaga "rapide" arrives just at the time when the best trains have left the Northern Station for Paris. We left Madrid Norte—again small and unimpressive—at 9.30 next morning. The Norte possesses some fine locomotives—notably the 4-8-0's built by Messrs. Babcock & Willcox at their Bilbao factory, and used to haul "rapides" from Madrid over the Guadarramas; the power of these locomotives is attested by the fact that they haul, apparently without difficulty and unassisted, trains of 13 bogie coaches up the inclines of the Sierra.

The ascent of the Guadarramas commences immediately after leaving Madrid, Collado Villalba is the first stop, and here the lines diverge, two single tracks running over the Sierra to Medina del Campo, where they rejoin. One route was ours,

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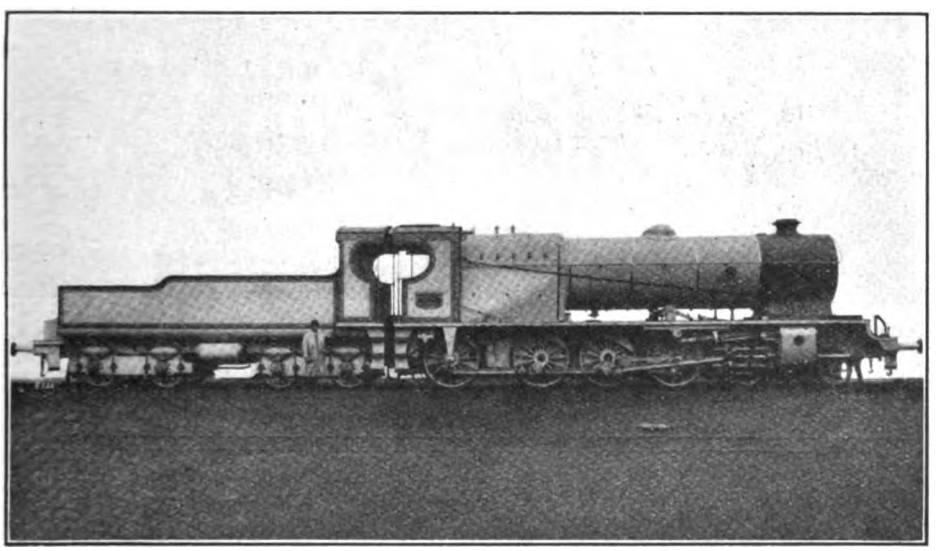
*via* the Puerto de Guadarrama and Segovia; the other past the Escorial and *via* Avila. After Collado Villalba the stiffest climb begins, some 20 miles against the collar with a ruling gradient of 1 : 56. The scenery is wild and cheerless: bare granite uplands with great outcrops of rock; practically no soil, except in the well-watered valleys. The line turns west eventually and crawls up the side of the range, with a fine retrospect towards Madrid, till it reaches about 4,000 ft. We then turn sharply north and penetrate the Puerto de Guadarrama by a tunnel 2,600 yards long. There is a reminiscence of Switzerland in the scenery on the further side of the pass; white mountains and dark green pine trees. Thence we descended at a round 50 m.p.h. to Segovia. The view on the descent is remarkable. Running north-east now, we have the white peaks to our right, while to the left we look down over an endless expanse of parched brown plain, which stretches out to Medina del Campo and Valladolid.

At Segovia we exchanged engines, replacing our 4-8-0 by a 4-6-2 locomotive built by the Société des Constructions Alsacienne. Thence to Burgos the journey is dull and uninteresting; flat brown plains—Medina del Campo the junction for Lisbon—more flat brown plains—an occasional glimpse of an overladen mule on a road—Valladolid and finally Burgos with its cathedral, and the white caps of the Sierra de la Demanda in the distance.

At Burgos there is grass again. We feel we are returning to the Europe we know. The cacti we lost before Madrid. And now we have left the desert-like plains of central Spain behind. We climb up after Burgos to the Puerto de Colli, through green hills faintly resembling Sussex downs and then rattle down to Pancorbo, picturesquely situated in a narrow gorge in the mountains, and thence to Miranda del Ebro. By now it is evening; the sun again sets behind the Sierra, which are wilder and fiercer than the hills at Ronda. From Miranda, on single track again, we climb up to Victoria and Alsasua and then rattle down the side of the Pyrenees through 27 tunnels on an incline of 1 : 57 to San Sebastian, with a glimpse of the Atlantic to the left, across the Bidaossa, and at last reach Hendaye and France—a change to the normal gauge train, which seems strangely small after the broad-gauge Spanish coaches.



**4-8-0 LOCOMOTIVE, NORTHERN RAILWAY OF SPAIN.**

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# SCENES ON THE GREAT NORTHERN RAILWAY OF U.S.A.

(*Photos. by C. R. Littlebury.*)

**SEATTLE-PORTLAND TRAIN AT KING STREET STATION, SEATTLE, WASH., U.S.A.**
4-6-2 locomotive No. 1360.

**4-8-2 LOCOMOTIVE No. 2515 AT INTERBAY ROUNDHOUSE, SEATTLE.**

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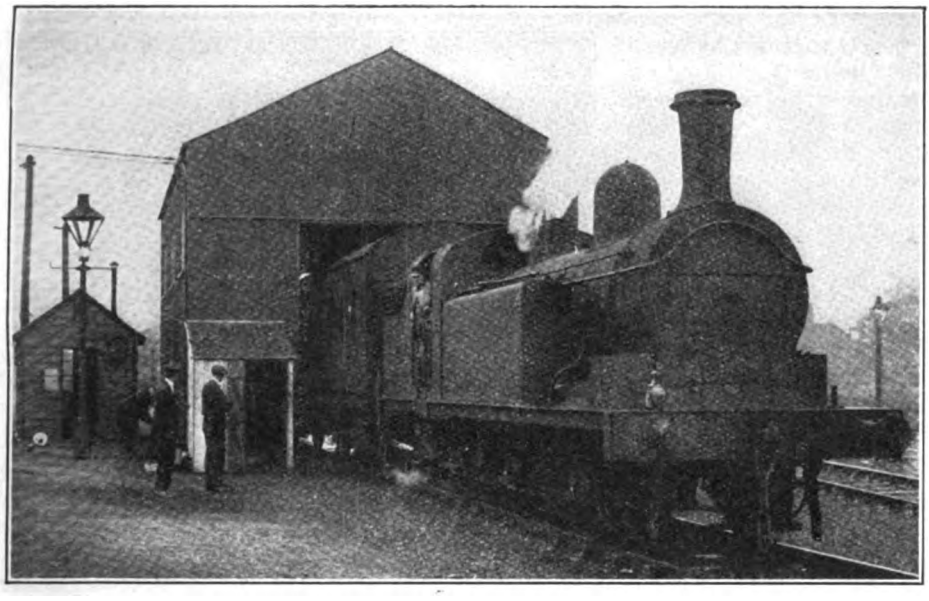

TRAIN PASSING THROUGH WASHING PLANT. [*Topical.*

# Carriage Cleaning Plant at York, L.N.E.R.

THE maintenance of coaching stock in a clean and attractive condition is a very important factor in the securing and retention of passenger traffic to the railways, but the cleaning operations necessary are extremely expensive in labour cost. With a view to improving the cleaning of the carriages and at the same time reducing to some extent the heavy expenditure, the London & North Eastern Railway has installed at Clifton Carriage Sidings, York, apparatus for the mechanical washing of the outsides of carriages. The apparatus takes the form of eight vertical mops, or wipers, placed in two rows, four at each side of the track, enclosed in a brick building built over the shunting neck from which access to all sidings in the carriage sheds is possible.

The mops consist of vertical iron shafts to which are affixed thousands of strips of cloth each measuring 4 in. in width and 25½ in. in length. The mops are rotated in opposite directions by means of electric motors at a speed of 50 r.p.m., the motors with the necessary gearing being placed on the framework above the vertical shafts. The cloth strips are saturated with water directed upon them from above, and suitable drains are provided in the concrete floor to carry away the water.

During the operation of washing the coaches travel at the rate of about one and a half miles per hour, and, on entering the machine, but before reaching the mops, they are sprayed with water from jets at both sides. As the mops rotate, the saturated cloth strips are flung out at right angles to the shafts and whirl vigorously against the sides of the vehicle, effectively removing all dirt. The length of the strips provides for a large cleaning surface being applied to the vehicles, and their flexibility permits of automatic adjustment to compensate for variations in the widths of different coaches and for irregularities in the width of each coach, such as inset doors and window frames, and projecting door and commode handles. As the vehicles are leaving the machine a final spray of clean water completes the washing



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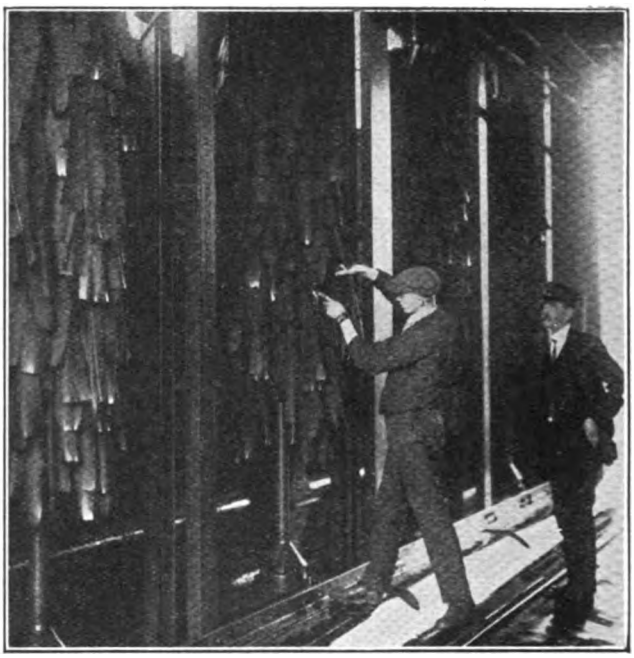
and ensures that dirt loosened by the apparatus is rinsed off before the coaches are allowed to dry.

After the vehicles have passed through the machine no further external work upon them is necessary. The windows can safely be left to dry without being wash-leathered, as the final clean water spray prevents any streaks of dirt being left on them, and the force of the revolving cloth strips polishes brass door and commode handles.

A bogie vehicle can be washed by means of the apparatus in from one and a half minutes, and the results are better than those obtained with ordinary hand washing, by reason of the increased force of the power-driven mops. At the same time the action of the apparatus is not so violent as to damage the paint and varnish of the vehicles.

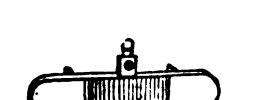


ATTENDING TO THE ROTARY WASHERS. [*Topical.*

At the present time it is found that ordinary washing by hand is not sufficient alone to keep the vehicles in a clean condition, and periodical special cleaning of vehicles by means of acid preparations is necessary in order to remove dirt and grease, which, after the ordinary washing with water by hand labour, is left adhering to the coaches. The final operation of the special cleaning by means of acid preparations is for the vehicles to be washed down with water, and the machines will be utilised for the performance of this work.

It is, moreover, anticipated that the very efficient removal of dirt by means of mechanical water washing will result in the special cleaning referred to being required only at longer intervals than has hitherto been the case.

One satisfactory feature of the machine is that as the plant is divided into two sections, each of which is driven by a 15-h.p. motor, it will be possible for one half of the plant to be laid off for repairs while the other is continuing the performance of its work. In these circumstances the vehicles will require to be shunted through at about half the speed previously mentioned.



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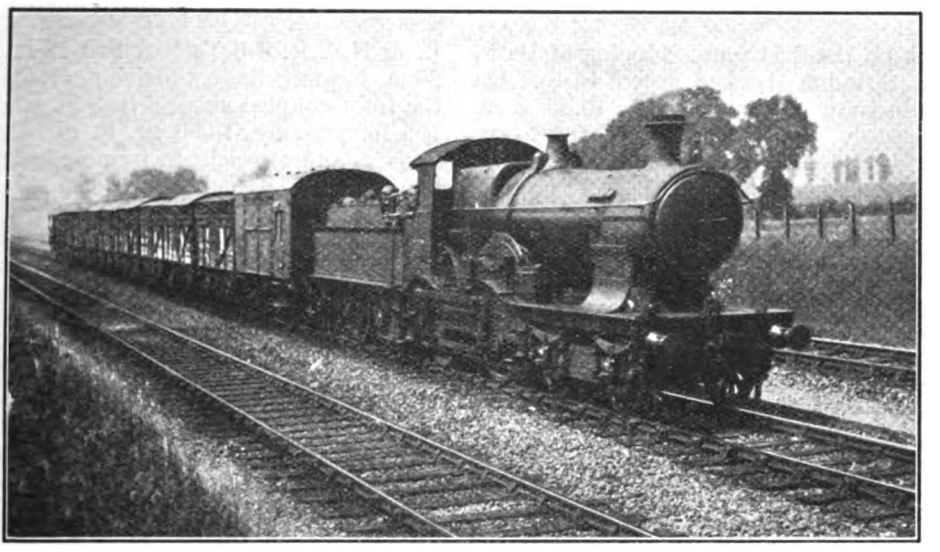

*Photo.*] [*J. Dearden.*

**UP SPECIAL, CONVEYING IRISH HORSES VIA FISHGUARD, NEAR CHALLOW G.W.R.**

4-4-0 locomotive *Shelburne*.

# Modern Locomotive Practice on the Great Western Railway. [No. XII.]

**By F. W. BREWER, A.I.Loco.E.**

A SERIES of locomotive trials of considerable importance and interest took place in 1910, when, from August 15 to August 27, an exchange of engines was effected between the G.W. and L. & N.W. railway companies. The engines concerned were all of the 4-6-0 type, those of the former company having four cylinders, and those of the latter a pair of inside cylinders. The G.W.R. lent No. 4005 *Polar Star* to the L. & N.W.R., on which line it competed with No. 1455 *Herefordshire*, while the engine which was handed over to the G.W.R. was No. 1471 *Worcestershire*, and this had as its rival No. 4003 *Lode Star*, working on the last-mentioned railway.

The *Polar Star*, on the L. & N.W.R., worked the 12.10 p.m. non-stop express from Euston to Crewe (booked speed 54.1 m.p.h.) on the first three days, returning on the 5.2 p.m. (booked speed 52·6), stopping at Rugby and Willesden. After having a shed day on the Thursday the Great Western engine hauled the 10.0 a.m. on the Friday and Saturday, this train having a stop at Rugby (booked speed 53·9). The L. & N.W. engine, *Herefordshire*, had a shed day on the Wednesday, and worked the 10.0 a.m. on the first two days, and the 12.10 p.m. on Thursday, Friday and Saturday. For the second week, this arrangement was reversed for the latter, and the *Polar Star* then took the 10.0 a.m. three times and the 12.10 p.m. twice.

The *Worcestershire*, on the G.W.R., commenced the first week by running the 9.0 a.m. semi-fast train (booked speed 47·8) from Paddington to Bristol, *via* Badminton, with stops at Ealing, Reading, Didcot and Swindon, returning on the 5.5 p.m. which slipped at Reading, and ran non-stop from Bristol (booked speed 58·8). On Tuesday, it worked the 11.0 a.m. 2-hours' Bristol express (scheduled speed 59·2), with a slip at Bath, and came



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back on the 5.54 p.m., stopping at Bath, and Swindon (booked speed 48·6). On Wednesday it hauled the 10.30 a.m. "Cornish Riviera" express to North Road, Plymouth, running light to Millbay. The next day it worked the 8.30 a.m. *ex* Millbay, which stopped at North Road, Mutley, Newton Abbot, Teignmouth, Dawlish, Exeter and Taunton, but from the latter station ran non-stop to London. On Friday, it was attached to the 11.50 a.m. Exeter express (booked speed 57·8), with slips at Westbury and Taunton, the engine working back on the 9.16 a.m. on the Saturday.

These duties, which, it is understood, were in turn performed by the G.W.R. engine *Lode Star*, were continued in the second week, although, apparently, not in exactly the same order, as the L. & N.W.R. 4-6-0 *Worcestershire* was taken out of the running on Thursday, August 25. On that day she had been allotted the task of again working the 11.50 a.m. to Exeter. The load *ex* Paddington was computed to be 420 tons to Westbury, and approximately 300 tons from Taunton, which latter weight had, therefore, to be hauled up the Wellington bank to Whiteball. Exeter was reached in about 3 hr. 13 min. (*i.e.*, roughly, 13 min. late), but on arrival there (according to the late Rev. W. J. Scott), the engine was found to be so badly strained that the officials decided, there and then, to bring the trials on the G.W.R. to a conclusion. Hence, after some necessary repairs, the *Worcestershire* returned to Paddington, running light, on the following day.

Both of the L. & N.W.R. engines belonged to the late Mr. George Whale's "Experiment" class, and were at that time virtually new, No. 1455 *Herefordshire* having been turned out at Crewe in November, 1909, and No. 1471 *Worcestershire* in January, 1910. The two G.W.R. engines were built at Swindon in 1907.

The foregoing experiments, the results of which were not made public, were noteworthy for the reason that the engines employed represented two radically different designs of 4-6-0's. The G.W.R., engines had four 14½-in. by 26-in. cylinders with a divided drive, 6 ft. 8½ in. coupled wheels, 225 lb. pressure, 2,142·91 sq. ft. of heating surface, and a weight in working order of 75 tons 12 cwts., whereas the L. & N.W.R. 4-6-0's had two 19-in. by 26-in. inside cylinders (driving, of course, the front coupled axle), 6 ft. 3 in. wheels, 195 lb. pressure, 1,990 sq. ft. of heating surface, and a weight in running order of 65¾ tons. The tenders weighed 40 and 37 tons, respectively. In the case of the two "Stars," the adhesion was 55 tons 8 cwts., and in that of the two "Shires," 46¾ tons. None of the four engines was superheated when the tests were carried out.

Notwithstanding, as I have said, that the actual working results of these trials were never published by either of the railways which took part in them, there is little doubt that one significant outcome was the adoption, by the late Mr. C. J. Bowen Cooke, of the now well-known "Claughton" class of four-cylinder simple 4-6-0's, designed by him in 1913, and of which class 130 examples were ultimately built at Crewe. All had two sets of Walschaerts gear, placed outside the frames.

These engines differed chiefly from those of the G.W.R. design in having a single drive on the leading coupled axle, and in having only 175 lb. pressure. The cylinders were 16 in. (now 15¾ in.) by 26 in., and the coupled wheels were 6 ft. 9 in. Some of the "Claughtons" have recently been rebuilt with much larger boilers, pressed at 200 lb., and this improvement is said to be the result of another series of tests with a G.W.R. four-cylinder engine, the *Launceston Castle*, which worked for a month, on the L. & N.W.R. in 1926.

Mr. Bowen Cooke had been appointed C.M.E. of the L. & N.W.R. on March 1, 1909, in the place of Mr. Whale, who had resigned through ill-health, and who died on March 7, 1910. Mr. Bowen Cooke was, therefore, in charge at Crewe when the locomotive exchange was arranged in 1910.

In considering the practical value of these 1910 trials, it must be borne in mind that the L. & N.W. engines were smaller, lighter, and less powerful than the G.W. engines. On the L. & N.W.R., the *Polar Star* and *Herefordshire* performed work which was seemingly well within their respective capacities; on the G.W.R., the *Lode Star* was also in its own element. Thus, by a process of elimination, the

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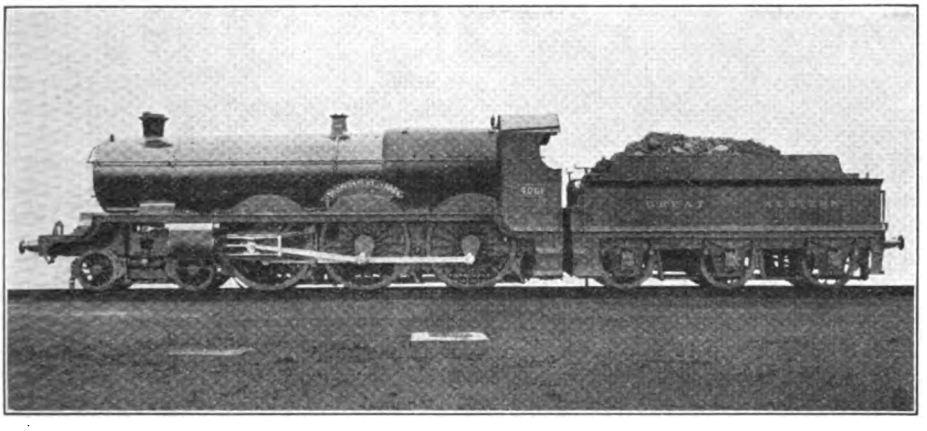
running of the North Western engine *Worcestershire* on the G.W.R. became the chief point of interest, and more especially so for the reason that the trains which this 4-6-0 hauled were generally not only very heavy, but were also timed at higher average speeds than were those on the competing railway. The Paddington to Exeter journeys were over gradients which were not greatly dissimilar from those on the Euston to Crewe section of the L. & N.W.R.; but those on the G.W.R. from Newton Abbot, applicable to the through runs to Plymouth, were of a different order altogether, and must have formed a severe test for an engine weighing just under 66 tons. Nevertheless, from what I have been able to gather, the to work their engines in what is now being elsewhere recognised as the most economical and most scientific way, but the usual conditions of employing such a method are that the valves should have a long travel, and that the boiler pressure should be a comparatively high one, as was the case in both respects with the G.W. engine alone. In any event, some preliminary running, or else a longer test, was necessary. This plan would, perhaps, have adjusted matters somewhat, and would have rendered the trials of greater value.

The log of a run by *Polar Star*, on the L. & N.W. Company's 5.2 p.m. express *ex* Crewe to Euston, on August 26, 1910, was given by Mr. C. J. Allen in the



FOUR-CYLINDER 4-6-0 No. 4051, "GLASTONBURY ABBEY."

*Worcestershire* put up a good fight. It was handicapped at times by having to make special stops for water, the tender holding 3,000 gallons as compared with the 3,500 gallons carried by the tender of the *Lode Star*, and this disadvantage was, I believe, accentuated by the fact that the track troughs were a greater distance apart than those on the L. & N.W.R. Then, again, two other factors would, by contrast, tend to add to the water consumption, viz., the steam pressure, lower by 30 lb. than that of the G.W.R. engine; and the method of operating the engine with a relatively late cut-off, the G.W.R. engine being worked with a systematically early cut-off. Each engine was, of course, run by its own driver and fireman. The G.W. men, however, had long been trained

RAILWAY MAGAZINE for November of that year. The train, which weighed 330 tons, was 1½ min. early at Rugby, and 35 sec. before time at Willesden, stops being booked at both places. The average speed for the 75¼ miles to Rugby was a little over 53 m.p.h., and that for the 77¼ miles from Rugby to Willesden, a trifle under 55 m.p.h. A speed of 71·5 m.p.h. was reached near Norton Bridge and also at Tamworth. At mile-post 74 (reckoned as from Crewe), the speed was 70·3, and the maximum for the whole journey was 72·6, at or near Castlethorpe, between Roade and Wolverton. The net time for the 158 miles was, Mr. Allen thought, equal to a non-stop run of 169 min. The *Polar Star's* coal consumption was understood to be generally less than that

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of the rival L. & N.W. 4-6-0, *Herefordshire.*

Reverting to the main subject, another item of general interest was that No. 4048 *Princess Victoria,* was specially re-named *Princess Mary* for the purpose of hauling the Royal Wedding train to Shifnal (Salop), on February 28, 1922, after the marriage of H.R.H. Princess Mary with Lord Lascelles at Westminster Abbey. The train, which consisted of four carriages and a saloon, ran non-stop to Shifnal. It left Paddington at 4.15 p.m., and arrived at its destination 4 min. early, viz., at 7.6 p.m., having covered the 135¼ miles at an average speed of 62 m.p.h. in 2 hr. 11 min.

As readers may like to know, in the case of the " 3100 " class of 2-6-2T's (5 ft. 8 in.) which of the engines have had their numbers increased by 2000, I have pleasure in giving a list of them :—

| Old No. | New No. | Old No. | New No. |
|---|---|---|---|
| 3112 | 5112 | 3120 | 5120 |
| 3113 | 5113 | 3122 | 5122 |
| 3114 | 5114 | 3134 | 5134 |
| 3115 | 5115 | 3136 | 5136 |
| 3116 | 5116 | 3138 | 5138 |
| 3117 | 5117 | 3145 | 5145 |
| 3118 | 5118 | 3148 | 5148 |
| 3119 | 5119 | 3149 | 5149 |

These engines have S/2 boilers, with 1,348·95 sq. ft. of heating surface and 200 lb. steam pressure. The weight of the engines in working order now totals 75½ tons of which 10¼ tons rest on the pony truck, 51¼ tons jointly on the coupled wheels, and 14 tons on the trailing radial axle.

The application of superheating to Great Western engines has been frequently referred to in these articles, and the time has now arrived for making a somewhat fuller mention of the matter. For the re-introduction of this very important feature into latter-day locomotive practice (for it dates back to comparatively early times), we were indebted to the late Dr. Wilhelm Schmidt—Doctor of Engineering in Germany—whose efforts to evolve a really practicable superheater commenced in about the year 1895, and eventually resulted, following the trial of various experimental designs, in the production in 1902 of his now well-known " smoke-tube " apparatus. The latter, often differing in arrangement and in detail, but remaining virtually the same in principle, is the one that has since been put into general use ; the one, in short, that has made locomotive superheating the universally successful proposition which it undoubtedly is at the present time.

In view, therefore, of the enormous progress which has been made with locomotive superheating during the past twenty-five years or so, it is distinctly interesting to note that Mr. G. J. Churchward was the first among British Chief Mechanical Engineers to give it a trial. This he did in May, 1906. Mr. George Hughes (then C.M.E. of the L. & Y.R.) also tried it in a couple of goods engines a few months later—in November and December—of the same year, but Mr. Hughes did nothing further, in the way of extending its application, until 1909. Mr. Churchward, however, realising its possibilities, carried out an unbroken series of tests, and after experimenting with the Schmidt and Cole types of apparatus (one on the latter principle was devised at Swindon and patented in 1907), he finally, in 1909, adopted a superheater of the smoke-tube kind in which each large flue housed from six to eight superheater steam tubes, which were arranged in pairs, instead of, as in the ordinary Schmidt type, in one continuous tube length. This modified design, now defined as the Swindon superheater, was the joint work of Mr. Churchward and two of his assistants, Mr. G. H. Burrows and Mr. C. C. Champeney. It was patented in 1909, and is now the property of the Superheater Co., Ltd., of London.

As a beginning, the standard Schmidt apparatus was tried. This was fitted to No. 2901 *Lady Superior* (of the " Saint " class) in May, 1906, No. 2901 thus becoming the first express engine on the G.W.R. to be superheated. The Cole superheater was next tested, and this was applied in May, 1907, to No. 4010 *Western Star* (of the four-cylinder 4-6-0 series). It was followed by the Swindon-designed variation of the Cole apparatus, which was patented by the G.W.R. in 1907, and which was fitted to the former 4-6-2, No. 111 *The Great Bear* (shortly to be described) in January, 1908; to 4-6-0 No. 4011 *Knight of the Garter* (four-cylinder) in March, and to No. 2922 *Saint Gabriel* (two-cylinder) in December, of that year.

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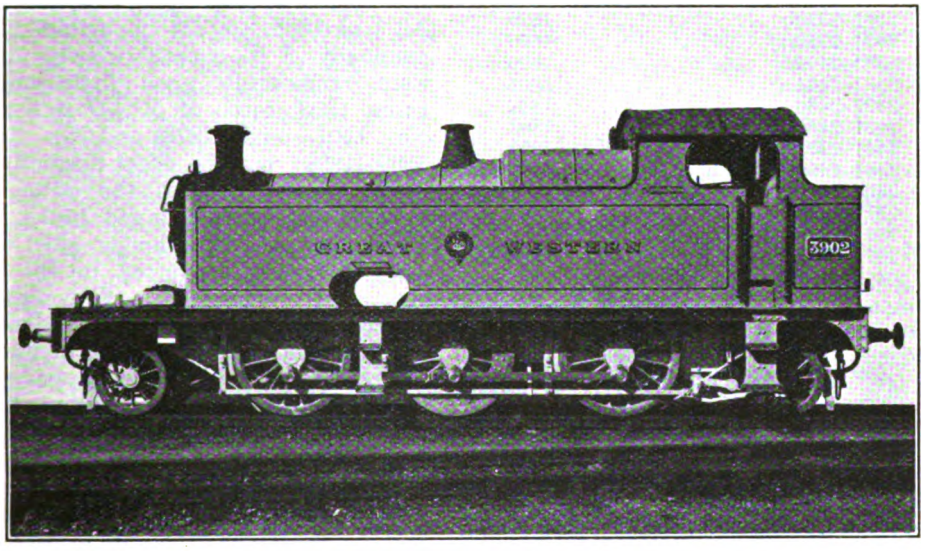
Then came the Swindon 1909 patent superheater. The latter, after being tested in No 4021 *King Edward*, which was equipped with it in June, 1909, was afterwards adopted by the G.W.R. as their standard apparatus. For a long time, dampers, placed in the smokebox and controlled from the cab, were employed with this superheater, but instead of dampers what are termed spark-plates are now provided. Another recent alteration consists in generally having only six superheater tubes in each large flue, as compared with the eight previously used in many cases. In 1910, it was stated that an economy of 12·5 per cent. in coal, and of from 25 to 30 per cent. in water consumption, was being obtained with this Swindon-type superheater on the G.W.R. The number of large flues varies according to the boiler dimensions, but in the case of some of the smaller boilers fewer smoke-tubes than formerly are now fitted, as pointed out by me when describing the engines concerned.

Locomotive construction during this period included the conversion to 5 ft. 2 in. 2-6-2 side-tank engines, with inside frames, inside cylinders 17½ in. by 24 in., and a pony truck at each end, of a number of Mr. Dean's standard 0-6-0 goods tender engines. Nine of the latter were thus altered in 1907, nine more in the following year, and two others in 1910. As tank engines, they were provided by Mr. Churchward with taper Belpaire boilers having 180 lb. pressure, 16·6 sq. ft. of grate area, and a total heating surface of 1,271·86 sq. ft. The tank capacity was 1,500 gallons, and the weight of the engines in working order, 62 tons 4 cwt., with practically 48 tons available for adhesion. According to official information, the engines of this class were not superheated until a few years ago. The 20 0-6-0's which they replaced had been constructed in 1896 and were numbered 2491—2510, but after being rebuilt as 2-6-2T's, they were renumbered 3901-3920 —not, however, in the exact order of their original numbers. The "3901's," which are the only 2-6-2 G.W.R. tank engines proper with inside cylinders, were turned out as under :—




**2-6-2 TANK ENGINE No. 3902.**

Converted from 0-6-0 tender locomotive.

| Nos. | Date. |
|---|---|
| 3901–3909 .. .. .. | 1907 |
| 3910–3918 .. .. .. | 1908 |
| 3919–3920 .. .. .. | 1910 |

An outstanding feature of this class consists in the long side tanks, which

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extend almost to the front of the smoke-box. They are hollowed out over the motion parts. I may add that equalisers are fitted to both leading and trailing pony trucks.

The 0-6-0's in question, Nos. 2491—2510, had formed part of Mr. Dean's standard goods class, of which, altogether, 280 engines were built at Swindon from 1883 to 1899, and were then numbered 2301—2580 (*vide* list).

G.W.R.
Dean's Standard 0-6-0 Goods Engines.
5 ft. 2 in. Wheels.

| Nos. | Date. |
|---|---|
| 2301–2320(*a*) .. .. .. | 1883 |
| 2321–2360(*b*) .. .. .. | 1884 |
| 2361–2370(*c*) .. .. .. | 1885 |
| 2371–2380(*c*) .. .. .. | 1886 |
| 2381–2400 .. .. .. | 1890 |
| 2401–2421 .. .. .. | 1891 |
| 2422–2430 .. .. .. | 1892 |
| 2431–2450 .. .. .. | 1893 |
| 2451–2463 .. .. .. | 1895 |
| 2464–2490 .. .. .. | 1896 |
| 2491–2510(*d*) .. .. .. | 1896 |
| 2511–2560 .. .. .. | 1897 |
| 2561–2576 .. .. .. | 1898 |
| 2577–2580 .. .. .. | 1899 |

(*a*) No dome when first built. Cylinders 17 in. by 24 in. inside frames.
(*b*) Dome; cylinders 17 in. by 24 in. Inside frames.
(*c*) Outside frames. Dome; cylinders 17 in. by 26 in.
(*d*) Cylinders 17½ in. by 24 in. Inside frames. Dome. Converted to 2-6-2T's, and re-numbered 3901-3920, in 1907–1910.
Scrapped :—Nos. 2308, 2334, 2387, 2420, 2448, 2453, 2542, and 2563.

Twenty of these, Nos. 2361—2380 (1885-6) had double frames and 17 in. by 26 in. cylinders, while the remainder had from 17 in. to 17½ in. by 24 in. cylinders (17½ in. from No. 2491) and inside frames only. Eight of the inside-framed engines have been broken up, so that, deducting the twenty conversions to 2-6-2T's, but including the double-framed series, there are 252 Dean standard 0-6-0's, now mostly or all rebuilt with non-taper Belpaire boilers, in service. In addition, there are 56 rebuilt examples of the old outside-framed classes (1864-1876) still at work. The majority of all these different goods tender engines have been fitted with superheaters. The Dean rebuilt engines now work at 180 lb., the others mostly at 165 lb.

As regards the tank engines of what I may call the pre-Churchward era, viz., those of the 2-4-0, 0-4-2, and 0-6-0 types, these comprise so many classes and vary so much in one way or another, that they cannot be dealt with within in the limits of this serial article. A comparatively short time ago, the combined total of such engines on the G.W.R. was, roughly, 1,400; consequently, they would need a fairly long article all to themselves.

A brief mention might, however, be made of the "Metropolitan" 2-4-0 tank engines, sixty of which were built at Swindon by Mr. Joseph Armstrong from 1869 to 1874, and fifty more during Mr. Dean's time, from 1878 to 1899, most of them being equipped with condensing gear. Some of Mr. Dean's lot, generally those without such apparatus, had cabs. All had 16 in. by 24 in. cylinders and, nominally, 5 ft. coupled wheels, and all were remarkably good little engines. From 1898, forty of Mr. Dean's series, Nos. 1401—1420 (1878) and Nos. 3581—3599 (1899) and No. 3500 (formerly No. 3600 and re-numbered at the end of 1912), were rebuilt with enlarged tanks. One engine having these longer side tanks, No. 3593, was converted to the 2-4-2 type, and provided with an overall cab, in 1905. This engine was broken up in 1927. Of the others, 109 in number, nineteen or so have been scrapped. The later boilers fitted to the "Metropolitan" tank engines have been of the Belpaire firebox kind, but superheating has not been applied to any of these engines.

The following list gives the numbers, and dates of construction, of the 2-4-0 "Metro" tanks :—

| Nos. | Date. | |
|---|---|---|
| 3—6 .. .. | 1869 | Armstrong. |
| 455—470 .. .. | 1869 | |
| 613—632 .. .. | 1871 | |
| 967—986 .. .. | 1874 | |
| 1401—1420 .. .. | 1878 | Dean. |
| 3561—3570 .. .. | 1894 | |
| 3581—3599 .. .. | 1899 | |
| 3600(*a*) .. .. .. | 1899 | |

(*a*) Re-numbered 3500 in December, 1912.

Of the above, those which have been scrapped are as under :—

| No. | | | No. | | |
|---|---|---|---|---|---|
| 3 | in | 1906 | 631 | in | 1898 |
| 4 | ,, | 1913 | 968 | ,, | 1906 |
| 462 | ,, | 1907 | 969 | ,, | 1907 |
| 466 | ,, | 1907 | 970 | ,, | 1904 |
| 614 | ,, | 1906 | 974 | ,, | 1904 |
| 618 | ,, | 1907 | 978 | ,, | 1907 |
| 619 | ,, | 1906 | 984 | ,, | 1906 |
| 622 | ,, | 1898 | 1402 | ,, | 1906 |
| 625 | ,, | 1903 | 1412 | ,, | 1906 |
| 629 | ,, | 1912 | 3593(*a*) | ,, | 1927 |

(*a*) As 2–4–2 engine.

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Continuing, the year 1908 witnessed the completion at Swindon of the first "Pacific" type tender locomotive in Great Britain. This engine was, of course, the former well-known 4-6-2 *The Great Bear*, No. 111. Designed by Mr. Churchward, it had four 15 in. by 26-in. cylinders, arranged as in the 4-6-0's, and 6 ft. 8½-in. coupled wheels. The taper boiler barrel was 23 ft. long and 6 ft. in maximum diameter; pressure, 225 lb.; total heating surface (at first), 3,400 sq. ft.; and grate area, 41·79 sq. ft. In working order, the engine weighed 97 tons and had 60 tons, equally divided, on the three coupled axles. The tender, of a type not previously employed on the G.W.R., was carried on two four-wheeled bogies. With 3,500 gallons of water and 6 tons of coal, its weight was 45¾ tons, which, nevertheless, was slightly less than that of the latest (1926) G.W.R. six-wheeled tenders.

Thus, the engine and tender turned the scale at 142 tons 15 cwt., an unprecedented total 20 years ago. As completed in January, 1908, *The Great Bear* had a Swindon "Cole" type superheater, but in August, 1913, she was fitted with the present form of apparatus (1909 Patent). With this alteration, the total heating surface became 3,261·25 sq. ft., to which 112 superheater steam tubes contributed 505·77 sq. ft. A small proportion of the original heating surface had been due to the provision of four arch tubes in the firebox. These tubes were subsequently removed, and their area is not included in the 1913 figures.

Owing to her weight and length, this fine engine, which had a tractive force of 27,800 lb., was not employed beyond Bristol. She used to work such trains as the 11 a.m. 2-hour Bristol express, and the 6.40 p.m. express from Paddington to Bristol; she also ran, in the up direction, vacuum-fitted goods trains. Strictly speaking, *The Great Bear* was undercylindered relatively to her boiler capacity, her nominal tractive effort being no greater than that of Mr. Churchward's later 4-6-0's, which, from 1914, also had 15-in. cylinders. However, in 1924, Mr. Collett scrapped the engine, and in its place built, as a 4-6-0 of the "Castle" class, a new No. 111, which he renamed *Viscount Churchill*, a title that had hitherto been borne by No. 2975, a two-cylinder 4-6-0 turned out in 1905.

On the G.W.R., the "Pacific" type has not so far been revived, and its use is at present confined to the L. & N.E.R. It appeared, 14 years after the completion of *The Great Bear*, on both the G.N. and N.E. lines, in 1922, Mr. H. N. Gresley being responsible for the G.N., and Sir Vincent Raven for the N.E. design. Two engines of each design were then constructed. On the formation of the L. and N.E.R. in 1923, Mr. Gresley became its C.M.E., and the 4-6-2's which followed were built under his supervision. In all, down to 1924, five of the "Raven" class, and 52 of Mr. Gresley's own Pacifics, had been constructed, the former at Darlington, and the latter (with the exception of 20 supplied by the North British Locomotive Company, Glasgow) at Doncaster, but a new series is now being built. Recently, two features, suggestive of Great Western practice, namely, a long valve travel, and a comparatively high steam pressure (220 lb., representing an increase of 40 lb.) have been tried in some of these G.N. class 4-6-2's with, it is said, excellent results. The "Raven" Pacifics, however, were designed to carry 200 lb., not 180 lb., from the first.

In 1910, Mr. Churchward introduced another new design—that of the 2-8-0 type of tank engines, with outside cylinders 18½ in. by 30 in., 4-ft. 7½-in. coupled wheels, and a leading pony truck with 3-ft. 2-in. wheels. The engines of this class were intended for hauling heavy goods and mineral trains, principally in Wales. The pioneer was No. 4201, and it was the first non-tender locomotive in this country to have the 2-8-0 wheel plan. Elsewhere, the 0-8-2 type has been favoured (it was in use on the Barry line in 1896; on the Port Talbot Railway in 1899; on the G.N.R. in 1903; on the L. & Y. in 1908; and on the L. & N.W. in 1911), and the G.W.R. is the only line on which, at the moment, 2-8-0 tank engines, as distinct from 2-8-0 tender locomotives, are employed. Down to the present time no fewer than 175 examples of these tank engines have been put into traffic on the G.W.R. The class numbers commence with No. 4200, but this engine was not built until 1923. The first, No. 4201, ran for some time before the second one,

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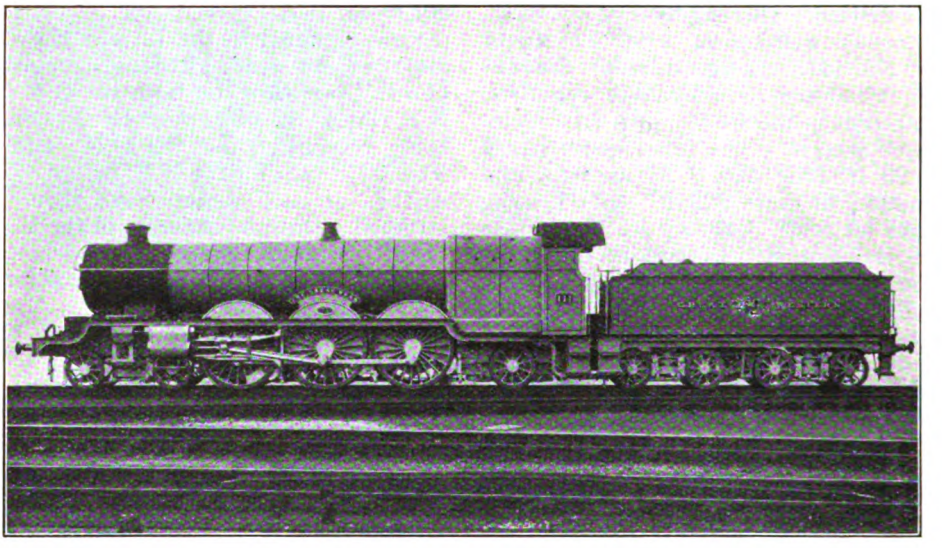

No. 111, "THE GREAT BEAR," AS ORIGINALLY BUILT.

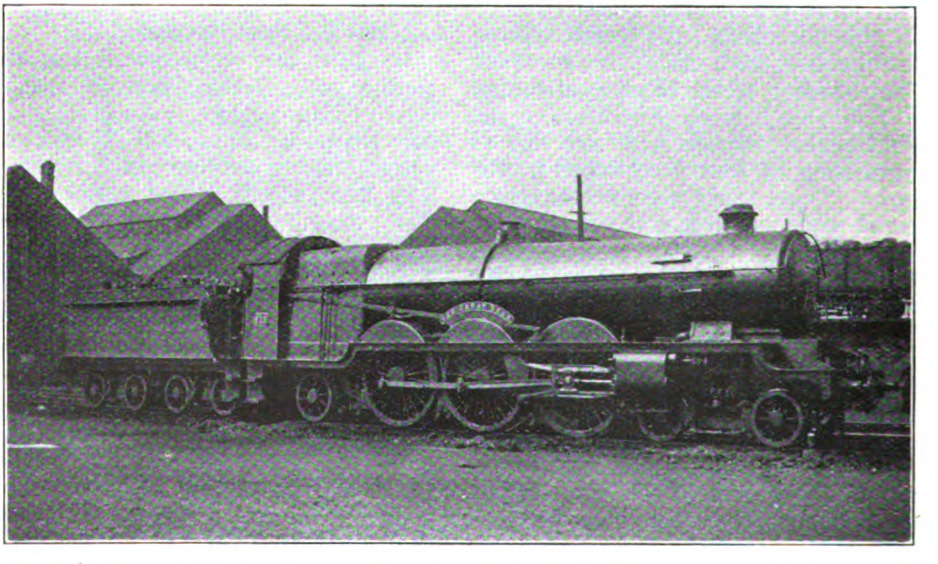

*Photo.*] [*F. H. Stingmore.*

4-6-2 LOCOMOTIVE No. 111 "THE GREAT BEAR," FITTED WITH TOP FEED, &c.

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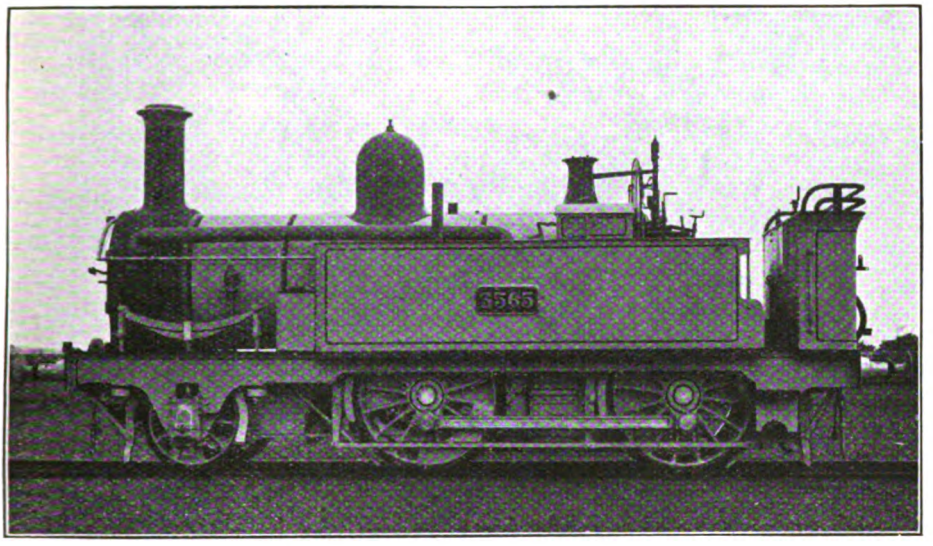
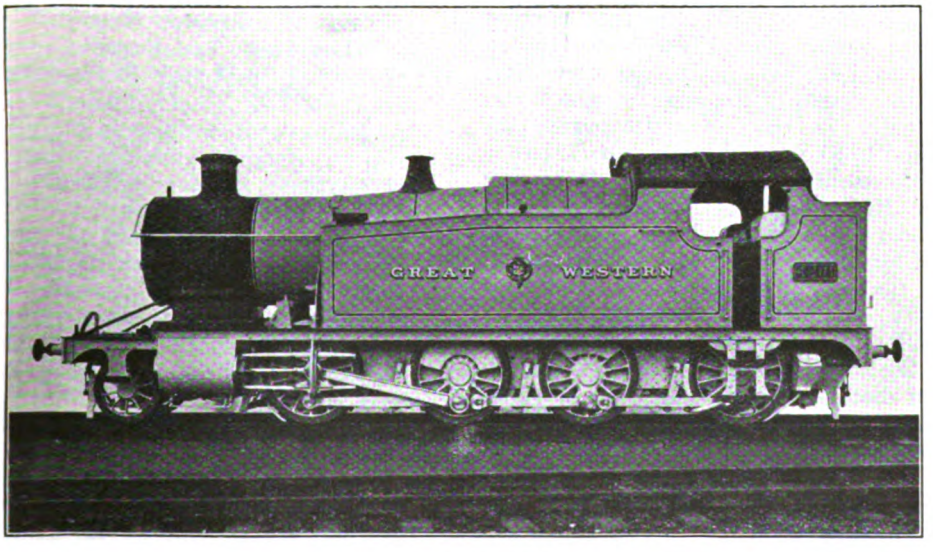



"METROPOLITAN" 2-4-0T No. 3565.




2-8-0T No. 4201.

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*Photo.*] [*W. H. Kelland.*

**BRISTOL-LONDON EXPRESS NEAR WESTBOURNE PARK.**

4-6-2 No. 111, *The Great Bear.*

No. 4202, was turned out. The numbers now run from 4200–4299, and from 5200–5274. All were built at Swindon, and all had superheaters when new. The cylinders remained 18½ in. by 30 in. down to and including No. 5204; the total heating surface varied from 1,566·74 sq. ft., at first, to 1,728·05 sq. ft., subsequently; and the weight of the engines, which was originally 78 tons, was afterwards increased to 81 tons 12 cwts., with 72¼ tons on the eight-coupled wheels. Beginning with No. 5205, the diameter of the cylinders was enlarged to 19 in.; the total heating surface was 1,670·15 sq. ft., and the weight of the engines 82 tons 2 cwts., of which 72½ tons were available for adhesion. In all cases, the grate area was 20·56 sq. ft. (boiler, 5 ft. 6 in. maximum diameter by 11 ft.); the working pressure was 200 lb., and the tank capacity 1,800 gallons. The 18½-in. cylinder series had a tractive force of 31,450 lb., while that of the 19-in. engines was 33,170 lb. I should add that the latter engines had outside steam pipes, enlarged coal bunkers, and a slightly greater length over buffers, viz., an increase of 6 in., as compared with the earlier engines. A list of the 175 examples is attached.

G.W.R.

List of 2-8-0 Tank Engines.

Cylinders 18½ in. to 19 in. by 30 in. Coupled wheels 4 ft. 7½ in.

| Nos. | Date. |
|---|---|
| 4200 .. .. .. .. | 1923 |
| 4201 .. .. .. .. | 1910 |
| 4202–4220 .. .. .. | 1912 |
| 4221–4231 .. .. .. | 1913 |
| 4232–4241 .. .. .. | 1914 |
| 4242–4251 .. .. .. | 1916 |
| 4252–4261 .. .. .. | 1917 |
| 4262–4270 .. .. .. | 1919 |
| 4271–4285 .. .. .. | 1920 |
| 4286–4294 .. .. .. | 1921 |
| 4295–4299 .. .. .. | 1922 |
| 5200–5202 .. .. .. | 1922 |
| 5203–5214 .. .. .. | 1923 |
| 5215–5244 .. .. .. | 1924 |
| 5245–5256 .. .. .. | 1925 |
| 5257–5274 .. .. .. | 1926 |

*Note.*—Nos. 5205–5274 were built with 19-in. cylinders.

(*To be continued.*)

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# British Locomotive Practice and Performance.

By CECIL J. ALLEN, M.Inst.T., A.I.Loco.E.

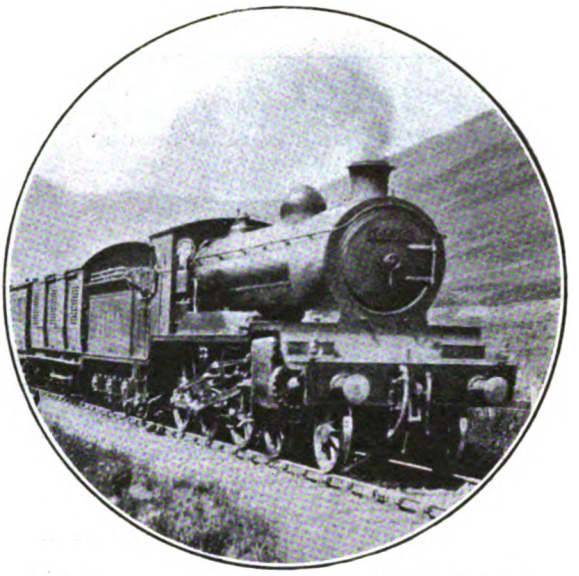

*Photo.*] [*C. J. L. Romanes.*

**OBAN-GLASGOW TRAIN NEAR TYNDRUM.**

L.M.S.R. 4-6-0 No. 14619.

A READER has forwarded to me a study of locomotive performance on the South Wales services of the Great Western Railway, which is of such remarkable interest that nothing short of reproduction in full could do justice to the care with which my friend has made his observations and compiled his matter. I do this the more gladly, as I well know the writer to be a locomotive engineer of no mean reputation, though he has strictly forbidden me to mention his name. It is pleasant to realise that with some, at least, of those who are concerned professionally with the technicalities of locomotive design, the work of the engines on the road still loses none of the fascination that it exercised over them in days gone by, and this fact will be patent to all those who read my correspondent's vivid description of his experiences. But let him take up his own tale without further introduction on my part.

"The main line of the Great Western Railway from Paddington to Cardiff," he writes, "has never figured so prominently in the articles on 'British Locomotive Practice and Performance' as most of the other main lines out of London. My recollection is that in only two articles during the last 13 or 14 years in which I have been a regular reader has the South Wales main line been represented by a comprehensive series of logs. On several occasions, however, you have described in detail individual runs over this route of such superlative merit that your readers must have been curious to know the calibre of the average day-to-day performance of the South Wales expresses. Two years ago, responding to urgent requests, you published the second of the series of logs to which I have referred. This contained some wonderful performances, one of which you confessed to having considered in connection with the 'best' runs of your 200th article, but you went out of your way to disparage the whole series on the score of unpunctuality—for which the locomotives were generally not responsible.

"Now I am aware that the standard of punctuality on this service is not as high, perhaps, as on some of the crack northern services. But compare the bookings! Contrary to your own beliefs, I hold that in general the faster the booking the lower the standard of punctuality; and to the high scheduled speed of the best of the South Wales expresses, in conditions of extreme congestion of traffic between



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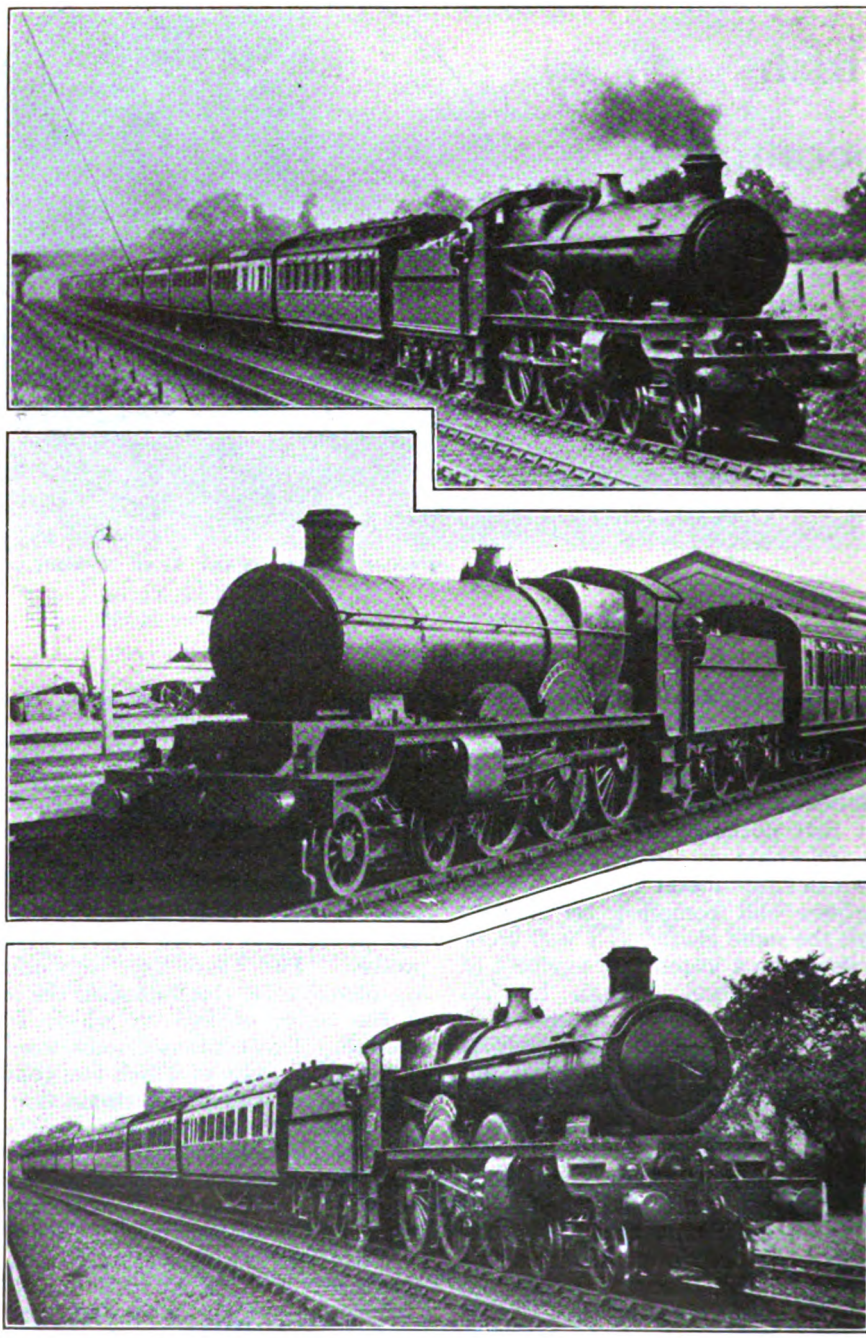

1. DOWN SOUTH WALES EXPRESS. FOUR-CYLINDER 4-6-0 No. 4063, "BATH ABBEY." *Photo. W. Leslie Good.*

2. DOWN SOUTH WALES EXPRESS AT SWANSEA (HIGH STREET). FOUR-CYLINDER 4-6-0 No. 4015, "KNIGHT OF ST. JOHN." *Photo. H. T. Hobbs.*

3. DOWN SOUTH WALES EXPRESS. FOUR-CYLINDER 4-6-0 No. 4049. "PRINCESS MAUD."

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Patchway and Cardiff and onerous maximum loading, do I attribute this comparative unpunctuality. On the other hand, I have found that, as compared with certain of the northern lines with which I am more familiar, a greater proportion of my South Wales journeys have been worth recording, and, indeed, that on certain trains, as, for instance, the 10.15 a.m. out of Cardiff, performances that would elsewhere be considered wholly exceptional in merit are of common occurrence.

"To support my plea, I enclose two tables of 14 journeys between London and Cardiff, seven down on the 3.55 p.m., and seven up on the 10.15 a.m. I have actually made a total of 30 journeys in both directions during the period under review (since the beginning of 1927). Some of these were on Sundays, or by excursion train; one of the earliest was made in the teeth of the gale in January, 1927; others were as good as, or especially in one case on the 7.55 p.m. down, better than, some of the runs here set forth, but are excluded to simplify the tables, as they were on other trains; and on only one occasion, apart from the stormy journey, was time actually lost by the locomotive. The standard of punctuality is actually not so bad as you have represented, as the accompanying logs show. We frequently arrived punctually, or before time, at Cardiff, and were occasionally as much as 5 min. early at Paddington in the up direction. I can only think you have been unfortunate in your experiences, as all my journeys were made at week-ends or at holiday time, when running conditions are likely to be the least favourable.

"The logs are tabulated in order of loading. It will be seen that four-cylinder engines figure exclusively on the 3.55 p.m. down, while the smaller 'Saints' monopolise the heavier 10.15 a.m. up; the former, however, has the faster booking. Net times have been very carefully calculated. In the down direction they make no allowance for the Badminton stop, which is almost invariably made, other than the deduction of any excess over 1 min. standing time, and in both cases they allow a 4-min. stop at Newport in cases where time was overstayed. They are sufficiently remarkable, I think, to deserve study and comparison, especially if the included stop be remembered, together with the fact that the up journey includes a practically continuous ascent of over 20 miles, of which seven are graded at 1 in 100, with only one short break—a really formidable climb.

G.W.R.—3.55 P.M. PADDINGTON TO CARDIFF.

TABLE OF MINIMUM TIMES.

(*See page* 126.)

| Distance. | | Times. | Speeds | Run No. |
|---|---|---|---|---|
| miles. | | m. s. | m.p.h. | |
| 0·0 | Paddington .. | 0 00 | — | † |
| 1·3 | Westbourne Park | 3 00 | — | † |
| 5·7 | Ealing Broadway | 8 25 | 61½ | † |
| 9·1 | Southall .. .. | 11 35 | 67 | † |
| 13·2 | West Drayton .. | 15 15 | 75 | † |
| 18·5 | Slough .. .. | 19 35 | 72 | † |
| 24·2 | Maidenhead .. | 24 30 | 69 | 3 |
| 31·0 | Twyford .. .. | 30 15 | 71 | 3 |
| 36·0 | Reading .. .. | 34 20 | 74½ | 3 |
| 41·5 | Pangbourne .. | 38 55 | 73 | 3 |
| 44·7 | Goring .. .. | 41 35 | 70 | 3 |
| 48·5 | Cholsey .. .. | 44 40 | 72 | 3 |
| 53·1 | Didcot .. .. | 48 35 | 75½ | 3 |
| 56·5 | Steventon .. | 51 25 | — | 3 |
| 60·4 | Wantage Road .. | 54 50 | 69 | 6 |
| 63·9 | Challow .. .. | 58 00 | 66 | 6 |
| 66·5 | Uffington .. .. | 60 20 | 70 | 2 |
| 71·6 | Shrivenham .. | 64 45 | 72 | 2 |
| 77·3 | Swindon .. .. | 69 35 | 77½ | 2 |
| 82·9 | Wootton Bassett* | 74 10 | 58* | 2 |
| 89·7 | Little Somerford .. | 80 20 | 76 | 3 |
| 94·2 | Hullavington .. | 84 05 | 66 | 3 |
| 100·0 | Badminton | 90 05 | — | 3 |
| | | 90 35 | — | 3 |
| 104·6 | Chipping Sodbury | 96 25 | — | 1 |
| 109·9 | Winterbourne .. | 100 55 | 74½ | 1 |
| 111·5 | Stoke Gifford* .. | 102 15 | 51* | 2 |
| 113·1 | Patchway* .. | 104 10 | 48* | 2 |
| 116·7 | Pilning .. .. | 107 30 | 76 | 2 |
| 118·1 | Severn Tunnel E.* | 108 40 | 65* | 4 |
| 122·5 | Severn Tunnel W. | 112 45 | 80 | 7 |
| 123·6 | Severn Tunnel Jc.* | 113 55 | 45–35† | 7 |
| 126·0 | Magor .. .. | 117 05 | 56 | 3 |
| 129·6 | Llanwern .. .. | 120 40 | 67 | 3 |
| 133·4 | Newport .. | 125 35 | — | 5 |
| | | 128 45 | — | 7 |
| 138·9 | Marshfield.. .. | 135 45 | 67 | 2 |
| 145·4 | Cardiff .. .. | 142 40 | — | 2 |

* Service slacks.

† *Hampton Court* with 290/310 tons. (*See* RAILWAY MAGAZINE, April, 1927, page 294.)

"Four of the down journeys were hampered at the start by track alterations between Paddington and Old Oak, yet singularly enough, the fastest start was made by a delayed train and the slowest



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GREAT WESTERN RAILWAY.—3.55 P.M. PADDINGTON TO CARDIFF.

| Distance. | Run No. / Engine: 4-cyl. 4-6-0 / Load (tons tare) / „ ( „ full) | Schedule. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|---|
| | Run No. | | 4081 | 4076 | 4090 | 4072 | 4054 | 4097 | 4083 |
| | Engine: 4-cyl. 4-6-0 | | 251 | 251 | 302 | 318 | 355 | 355 | 356 |
| | Load (tons tare) | | 270 | 270 | 325 | 340 | 380 | 385 | 385 |
| miles. | | min. | m. s. | m. s. | m. s. | m. s. | m. s. | m. s. | m. s. |
| 0·0 | Paddington | 0 | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 |
| | | | | | | p.w.c. | p.w.c. | | |
| 1·3 | Westbourne Park | — | 2 50 | 2 50 | 3 15 | 3 25 | 3 20 | 3 25 | 3 20 |
| | | | p.w.c. | p.w.c. | | | | | |
| 5·7 | Ealing Broadway | — | 10 20 | 8 45 | 9 10 | 10 15 | 10 25 | 10 15 | 9 50 |
| 9·1 | Southall | 11 | 13 55 | 12 00 | 12 45 | 14 00 | 14 10 | 14 30 | 13 35 |
| 13·2 | West Drayton | — | 17 55 | 15 45 | 16 45 | 18 05 | 18 20 | 19 00 | 17 50 |
| | | | p.w.r. | | | | p.w.r. | | |
| 18·5 | Slough | 20 | 24 35 | 20 10 | 21 20 | 22 35 | 24 10 | 23 55 | 22 30 |
| 24·2 | Maidenhead | 25½ | 30 20 | 25 40 | 26 15 | 27 40 | 29 40 | 29 00 | 27 45 |
| 31·0 | Twyford | 31½ | 36 25 | 32 30 | 32 00 | 34 00 | 35 55 | 34 55 | 33 55 |
| | | | p.w.c. | p.w.c. | | | | | |
| 36·0 | Reading | 37 | 41 50 | 37 50 | 36 05 | 38 35 | 41 15 | 39 10 | 38 20 |
| 38·6 | Tilehurst | — | 45 10 | 41 00 | 38 20 | 41 00 | 45 00 | 41 25 | 40 40 |
| 41·5 | Pangbourne | — | 48 05 | 43 45 | 40 40 | 43 35 | 46 10 | 43 50 | 43 10 |
| 44·7 | Goring | — | 51 00 | 46 35 | 43 20 | 46 35 | 51 15 | 46 30 | 46 05 |
| 48·5 | Cholsey | — | 54 20 | 49 45 | 46 25 | 50 05 | 54 45 | 49 35 | 49 25 |
| | | | | p.w.r. | | sigs. | | | p.w.c. |
| 53·1 | Didcot | 53 | 58 30 | 54 50 | 50 20 | 57 05 | 59 05 | 53 30 | 54 15 |
| 56·5 | Steventon | 56½ | 61 35 | 58 50 | 53 10 | 61 35 | 62 10 | 56 25 | 59 10 |
| | | | | | sigs. | | | | p.w.r. |
| 60·4 | Wantage Road | — | 65 05 | 62 50 | 57 20 | 65 45 | 65 50 | 59 50 | 63 50 |
| 63·9 | Challow | — | 68 15 | 66 00 | 61 20 | 69 05 | 69 10 | 63 00 | 67 40 |
| 66·5 | Uffington | — | 70 40 | 68 20 | 64 20 | 71 30 | 71 35 | 65 20 | 70 25 |
| 71·6 | Shrivenham | — | 75 20 | 72 45 | 69 55 | 76 00 | 76 20 | 69 55 | 75 40 |
| 77·3 | Swindon | 77 | 80 35 | 77 35 | 75 30 | 81 00 | 81 45 | 75 05 | 81 25 |
| 82·9 | Wootton Bassett* | 83 | 85 35 | 82 10 | 80 25 | 85 45 | 86 50 | 80 20 | 86 55 |
| | | | | | | | | | p.w.c. |
| 89·7 | Little Somerford | — | 91 50 | 88 25 | 86 35 | 92 00 | 93 05 | 87 05 | 93 50 |
| 94·2 | Hullavington | — | 96 05 | 92 50 | 90 20 | 96 05 | — | 91 45 | 98 40 |
| 100·0 | Badminton | 103 | 102 55 | 99 45 | 96 20 | 102 40 | 105 50 | 99 05 | 105 55 |
| | | | 104 10 | 100 10 | 96 50 | 103 15 | 106 25 | 100 05 | 108 10 |
| 104·6 | Chipping Sodbury | — | 110 00 | 106 10 | 103 40 | 109 45 | 113 10 | 106 35 | 115 05 |
| 109·9 | Winterbourne | — | 114 30 | 110 50 | 108 25 | 114 20 | 118 15 | 111 35 | 120 15 |
| 111·5 | Stoke Gifford E.* | 114 | 115 50 | 112 10 | 110 00 | 115 40 | 119 40 | 113 00 | 121 35 |
| | | | | | sigs. | | | | |
| 113·1 | Patchway* | 116 | 117 55 | 114 05 | 112 25 | 117 45 | 121 45 | 115 00 | 123 35 |
| | | | | | sigs. | | | p.w.r. | |
| 116·7 | Pilning | — | 121 35 | 117 25 | 118 25 | 121 15 | 125 25 | 119 05 | 127 10 |
| 118·1 | Severn Tunnel E.* | — | 122 55 | 118 45 | 120 05 | 122 25 | 126 40 | 120 40 | 128 20 |
| 122·5 | Severn Tunnel W. | 127 | 129 40 | 123 45 | 125 15 | 127 10 | 131 35 | 126 05 | 132 25 |
| | | | | sigs. | | | | | |
| 123·6 | Severn Tunnel Jc.* | 128½ | 131 30 | 125 40 | 126 45 | 128 40 | 133 10 | 127 40 | 133 35 |
| 126·0 | Magor | — | 134 50 | 129 30 | 129 55 | 132 00 | 136 45 | 130 55 | 136 55 |
| | | | | | | | | | p.w.c. |
| 129·6 | Llanwern | — | 138 40 | 133 10 | 133 30 | 135 50 | 140 45 | 134 40 | 142 05 |
| | | | | sigs. | p.w.c. | | | p.w.c. | |
| 133·4 | Newport | 140 | 144 00 | 143 10 | 139 00 | 140 55 | 145 40 | 140 00 | 148 00 |
| | | 144 | 147 10 | 146 30 | 142 55 | 146 15 | 154 30 | 144 05 | 151 10 |
| | | | sigs. | | sigs. | | | | |
| 138·9 | Marshfield | — | 156 05 | 153 30 | 152 00 | 154 00 | 162 55 | 152 05 | 159 30 |
| 145·4 | Cardiff | 160 | 163 55 | 160 25 | 160 15 | 161 15 | 170 45 | 159 15 | 167 10 |
| | Net times (min.):— | | | | | | | | |
| 100·0 | To Badminton | 103 | 96 | 95 | 92¾ | 97 | 100 | 99 | 101 |
| 133·4 | To Newport | 140 | 136¾ | 132¼ | 131¼ | 135¼ | 140¾ | 139 | 139¾ |
| 145·4 | To Cardiff | 160 | 155 | 140¾ | 151¼ | 154¼ | 161 | 158¼ | 158¾ |

* Service slacks.

Names of engines: 4081, *Warwick Castle*; 4076, *Carmarthen Castle*; 4090, *Dorchester Castle*; 4072, *Tresco Abbey*; 4054, *Princess Charlotte*; 4097, *Kenilworth Castle*; 4083, *Abbotsbury Castle*.

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GREAT WESTERN RAILWAY.—10.15 A.M. CARDIFF TO PADDINGTON.

| Distance. | Run No... .. .. .. / Engine : 2-cyl. 4-6-0 .. / Load (tons tare) .. / „ ( „ full) .. .. | Schedule. | 8 / 2984 / 348 / 375 | 9 / 2901 / 355 / 385 | 10 / 2972 / 358 / 385 | 11 / 2972 / 365 / 390 | 12 / 2986 / 390 / 420 | 13 / 2928 / 395 / 425 | 14 / 2902 / 449 / 485 |
|---|---|---|---|---|---|---|---|---|---|
| miles. | | min. | m. s. | m. s. | m. s. | m. s. | m. s. | m. s. | m. s. |
| 0·0 | Cardiff .. .. .. | 0 | 0 00 | 0 00 sigs. | 0 00 p.w.r. | 0 00 | 0 00 | 0 00 | 0 00 |
| 6·5 | Marshfield .. .. | — | 9 45 sigs. | 10 10 sigs. | 10 30 | 9 25 | 9 30 p.w.r. | 9 30 | 9 20 |
| 12·0 | Newport .. .. .. | 16 | 19 05 | 17 05 | 17 50 | 16 05 | 18 25 | 15 50 | 15 50 |
| 0·0 | — | 0 | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 |
| 3·8 | Llanwern .. .. | — | 6 25 | 6 35 | 7 10 | 6 25 | 6 20 | 6 25 | 6 35 |
| 7·4 | Magor .. .. .. | — | 10 20 | 10 30 | 11 40 | 10 20 | 10 15 | 10 15 | 10 35 |
| 9·8 | Severn Tunnel Jc.* .. | 12 | 13 15 | 13 10 | 14 25 | 13 00 | 13 00 | 12 55 | 13 35 / 16 15† |
| 10·9 | Severn Tunnel W. .. | 14 | 14 45 | 14 35 | 15 55 | 14 25 p.w.r. | 14 20 | 14 40 | 19 45 |
| 15·3 | Severn Tunnel E. .. | — | 20 15 | 19 25 | 21 00 | 24 35 | 19 30 | 19 55 | 25 00 |
| 16·7 | Pilning .. .. .. | — | 22 50 | 21 40 | 23 35 | 28 35 | 22 05 | 22 30 | 27 15 |
| 20·3 | Patchway .. .. | 30 | 30 00 | 29 05 | 31 10 | 36 15 | 29 10 | 30 05 | 33 20 |
| 21·9 | Stoke Gifford E. .. | 32 | 32 40 | 31 40 | 33 55 | 39 05 | 31 55 | 32 50 | 35 40 |
| 23·5 | Winterbourne .. .. | — | 34 55 | 33 55 | 36 25 | 41 25 | 34 10 | 35 05 | 37 40 |
| 24·9 | Coalpit Heath .. .. | — | 36 40 | 35 25 | 38 25 | 43 10 | 35 55 | 36 50 | 39 10 |
| 28·8 | Chipping Sodbury .. | — | 41 20 | 40 00 | 43 55 | 48 00 | 40 45 | 41 30 | 43 35 |
| 33·4 | Badminton .. .. | 47 | 47 00 | 45 50 | 50 00 | 53 40 | 46 15 | 47 00 | 49 20 / 49 45 |
| 39·2 | Hullavington .. .. | — | 52 50 | 52 10 | 56 05 | 59 20 | 51 50 | 52 55 | 57 45 |
| 43·7 | Little Somerford .. | — | 56 45 | 55 55 | 60 00 | 62 50 | 55 35 | 56 40 p.w.r. | 61 50 |
| 46·4 | Brinkworth .. .. | — | 59 10 | 58 20 | 62 35 | 65 05 | 57 55 | — | 64 25 |
| 50·5 | Wootton Bassett* .. | 63 | 63 35 | 62 40 | 67 10 | 69 00 | 61 55 | 68 10 | 69 05 |
| 56·1 | Swindon .. .. | 69 | 69 50 | 69 00 | 73 30 | 74 30 | 67 50 | 75 10 | 76 40‡ / 79 40 |
| 61·8 | Shrivenham .. .. | — | 75 30 | 74 35 | 79 30 | 79 35 | 73 30 | 80 45 | 88 05 |
| 66·9 | Uffington .. .. | — | 80 10 | 79 10 | 84 25 | 83 50 p.w.c. | 78 20 | 85 10 sigs. | 92 55 |
| 69·5 | Challow .. .. .. | — | 82 35 | 81 30 | 87 00 | 86 45 | 80 45 | 87 45 | 95 20 |
| 73·0 | Wantage Road .. .. | — | 85 45 | 84 35 | 90 20 | 92 20 | 83 55 | 92 05 | 98 25 |
| 80·3 | Didcot .. .. .. | 95 | 92 10 | 90 50 | 97 10 | 98 55 | 90 25 | 98 40 | 104 40 |
| 84·9 | Cholsey .. .. .. | — | 96 20 | 95 10 | 101 30 | 102 55 | 94 50 | 102 40 | 108 35 |
| 88·7 | Goring .. .. .. | — | 99 45 | 98 50 | 104 55 | 106 10 | 98 25 | 105 50 | 111 45 |
| 91·9 | Pangbourne .. .. | — | 102 45 | 102 05 | 108 00 | 109 05 | 101 35 | 108 30 | 114 35 |
| 94·8 | Tilehurst .. .. | — | 105 30 | 104 50 | 110 40 | 111 40 | 104 30 | 111 05 | 117 05 |
| 97·4 | Reading .. .. .. | 112 | 108 15 | 107 20 | 113 05 | 113 50 | 107 10 p.w.c. | 113 15 | 119 25 |
| 102·4 | Twyford .. .. .. | 117 | 113 25 | 112 10 | 117 40 | 118 20 | 114 00 | 117 50 sigs. | 124 10 |
| 109·2 | Maidenhead .. .. | 124 | 119 25 | 118 30 | 123 40 | 124 05 | 120 20 | 125 10 | 130 30 |
| 110·9 | Taplow .. .. .. | — | 121 10 | 120 15 | 125 10 | 125 35 | 121 55 | 127 35 | 132 05 |
| 115·0 | Slough .. .. .. | 130 | 124 45 | 124 00 | 128 40 | 129 00 | 125 30 | 131 45 | 135 50 |
| 120·3 | West Drayton .. .. | — | 129 40 | 129 10 | 133 20 | 133 30 | 130 30 | 136 45 | 141 00 |
| 124·3 | Southall .. .. .. | 139 | 133 45 | 133 15 | 137 10 | 137 15 | 134 30 | 140 35 | 145 05 |
| 127·6 | Ealing Broadway .. | — | 137 05 | 136 25 p.w.r. | 140 10 p.w.r. | 140 15 | 137 45 sigs. | 143 35 sigs. | 148 25 |
| 132·1 | Westbourne Park .. | — | 141 45 | 140 55 sigs. | 146 15 | 144 35 | 143 50 | — sigs. | 153 00 |
| 133·4 | Paddington .. .. | 150 | 144 25 | 147 05 | 148 55 | 147 10 | 147 05 | 158 05 | 155 40 |
| | Net times (min.) :— | | | | | | | | |
| 133·4 | From Newport .. | 150 | 144½ | 143½ | 147 | 136½ | 142¾ | 140¼ | — |
| 145·4 | From Cardiff .. .. | 170 | 164¾ | 163½ | 166¾ | 155¾ | 162¾ | 160 | — |

* Service slacks. † 2-6-2T No. 3152 attached as pilot. ‡ Pilot detached.

Names of engines: 2984, *Guy Mannering*; 2901, *Lady Superior*; 2972, *The Abbot*; 2986 *Saint Sebastian*; 2928, *Robin Hood*; 2902, *Lady of the Lake*.



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by an undelayed train, with as much as 2½ min. difference between them in the first nine miles. Undelayed, the drivers seemed content to saunter out on their 59-m.p.h. schedule to Badminton as though they had all day before them; hindered by enforced slowings, they stirred their engines to mighty feats of acceleration. *Warwick Castle*, on run No. 1, was severely slowed at Ladbroke Grove, but reached 67 m.p.h. at West Drayton and 70 at Twyford between the two succeeding permanent-way slacks to 30 m.p.h. Getting away splendidly from Reading again, we reached 70 m.p.h. at Cholsey; 63 was the lowest rate on the gradual rise to Shrivenham, and we very rapidly accelerated through Swindon to 74, before slacking to 55 m.p.h. at Wootton Bassett. Down the 1 in 300 to Somerford we attained 75 m.p.h., and up the succeeding 10 miles at the same grade did not fall below 54, prior to making the usual cautious stop at Badminton. Despite three permanent-way checks, indeed, we left Badminton only 1¼ min. behind time. But the succeeding allowance of 37 min. to Newport, including, as it does, no less than four service slacks, leaves practically no margin; in particular, it is almost impossible, if the Badminton stop be made, for any engine to clear Stoke Gifford, 11·5 miles, in 11 min. from the start and at reduced speed, whilst the concluding allowance of 11½ min. for the 9·8 miles from the Severn Tunnel Junction slack to the stop at Newport is also generally insufficient. By an exceedingly rapid acceleration and a top speed of 74½ m.p.h. at Winterbourne, *Warwick Castle* managed to pass Stoke Gifford, at 48 m.p.h., in 11 min. 40 sec., but after regaining a rate of 74 m.p.h. below Patchway, a cautious passage of the tunnel followed, with a subsequent minimum rate of 26 m.p.h. at the top of the three miles' rise at 1 in 90 to the junction. So we reached both Newport and Cardiff 4 min. late. A word of praise might, at this point, be bestowed on the station staff at Newport who, as will be seen from the table, frequently curtailed their time allowance. But on this occasion, as often happens, the gain was immediately lost in High Street tunnel by the passage of one of the interminable succession of coal trains that crosses the main line just beyond.

"In columns 2 and 3 there appear two runs that demonstrate the suitability of the 'Castle' class for very fast runs with trains of moderate weight—runs of the kind I think you had in mind some years ago when outlining possible minimum schedules over the chief main lines in this country. *Carmarthen Castle*, despite the initial hindrance at Ladbroke Grove (not so severe as on the previous run), made an excellent start, passing Ealing at 60 m.p.h., Southall at 66, and Iver at 72½. The engine was then eased, and we fell to 61 m.p.h. by Maidenhead. A recovery to 67 beyond Sonning Cutting preceded a slack over a new bridge at Reading to 28 m.p.h. A wonderful acceleration followed, whereby we regained the mile-a-minute rate in just over two miles; speed gradually rose to 71 m.p.h. at Cholsey, when we were again checked for permanent-way operations, this time to 24 m.p.h. For the third time we vigorously gathered speed, so that we were travelling at 65½ m.p.h. through Wantage Road station and 69 at Challow; despite the faintly rising tendency of the road, acceleration continued; 70 was the rate through Uffington, 73 through Swindon, and no less than 77½ on the easier stretch before Wootton Bassett. After slacking over the junction, a maximum of 73 was attained at Little Somerford, and the minimum before shutting off steam for the stop was 54½. Leaving Badminton 3 min. early, we should have experienced no difficulty in reaching Newport on time, despite the signal check at Severn Tunnel Junction, but for a dead stand at Liswerry Crossing while a goods train cleared its tail into the loop ahead. Speeds were 70 at Winterbourne, 76 at Pilning, 37 on the 1 in 90 out of the tunnel, and yet another rapid acceleration to 66 at Llanwern. Station time was again curtailed at Newport, and this remarkable run concluded with its fifth demonstration of the accelerative power of the engine and the extraordinary time of 13 min. 55 sec. for the 12 level miles to Cardiff, start-to-stop, top speed being 67 m.p.h. So we arrived practically on time, after three permanent-way checks, and a severe slowing and a dead stand for signals.

"*Dorchester Castle* outdid even this performance, and achieved *en route* one

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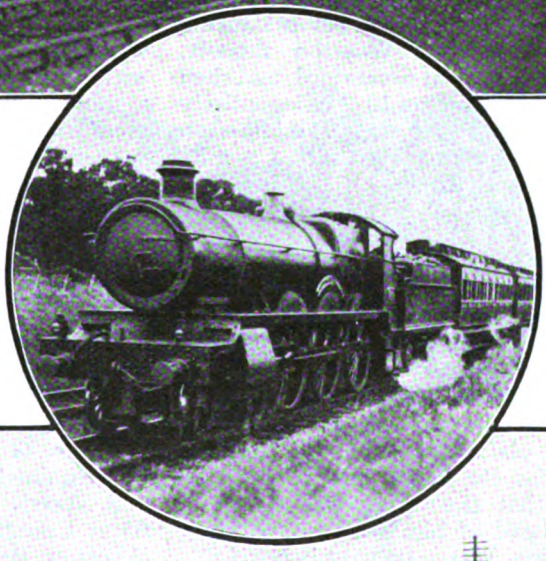

1. DOWN SOUTH WALES EXPRESS. FOUR-CYLINDER 4-6-0 No. 4004. "MORNING STAR."
*Photo. M. W. Earley.*

2. DOWN SOUTH WALES EXPRESS. TWO-CYLINDER 4-6-0 No. 2949. "STANFORD COURT."
*Photo. P. Ransome-Wallis.*

3. DOWN SOUTH WALES EXPRESS. FOUR-CYLINDER 4-6-0 No. 4029 "THE SPANISH MONARCH" AND TWO-CYLINDER 4-6-0 No. 2943, "HAMPTON COURT." *Photo. J. Dearden.*

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of the most remarkable feats I have ever recorded. Speed rose to 72 m.p.h. at Slough, and after brief intermissions at 69 and 71, to 73 at Twyford and 74½ at Reading. At Goring the rate was 70, but through Didcot we were travelling at 75½, and we had covered over 43 miles at an average of 71½ an hour, when our exhilarating progress was cut short by a signal check to 43, at Wantage Road. From this we recovered slowly, and for ten miles or more dawdled along at 53½ m.p.h., the speed seeming very slow by contrast. Through Swindon, however, the driver suddenly infused renewed energy into his engine; we regained a speed of 73 m.p.h. before slacking rather rigorously at Wootton Bassett, attained 76 m.p.h. at Somerford, and then covered the concluding 10·3 miles entirely *up* at 1 in 300 *to the stop* at Badminton platform in the amazing time of 9 min. 45 sec., and with 325 tons! This involved a *minimum* speed of 66 m.p.h. round the curves, and into the tunnel between Hullavington and Badminton, and an *acceleration* to 68 up the continuation of the same grade, whilst speed was still actually rising when steam was shut off prior to negotiating the cross-over at the east end of Badminton station, and drawing the train up with the customary care at the platform. It has been difficult to allow for the signal check. As it is probable that the driver was aware of a train ahead of him between Wantage and Swindon, I have thought it justifiable to allow him the same time between these points as was recorded on other comparable journeys. Obviously if his general rate of progress had been maintained we should have taken even less than this. Delay included, we had run the 100 miles to Badminton in 96 min. 20 sec. start-to-stop. The remainder of the run was spoiled by delays, caused by our being so much ahead of time. Speed was 73 m.p.h. at Winterbourne, 35 at Severn Tunnel Junction, and 67 at Llanwern, and we reached Cardiff punctually.

"*Tresco Abbey*, in Run No. 4, attained 58 m.p.h. at Southall and 73½ at Slough, fell to 62½ in Sonning Cutting, passed Reading at 70 and Goring at 64. At Didcot we were stopped dead by signal, but once again a magnificent recovery was made, speed reaching 60 m.p.h. before Wantage Road and steadily rising to 70 at Shrivenham and 73 beyond Swindon. Wootton Bassett Junction was taken rather faster than usual, and after a maximum of 71½ the excellent speed of 56 was sustained with 340 tons on the upper part of the 1 in 300 incline. On this occasion the driver did well to lose only 40 sec. on the booking from Badminton to Newport. Speed was 74 m.p.h. at Winterbourne and 75 below Pilning, with intervening slacks to 49 at Stoke Gifford and Patchway. Entering the tunnel at 65 we attained 72 in its depths, mounted the 1 in 90 at a minimum of 33½, and regained 63 at Llanwern. Overtime was spent at Newport on this occasion, but a smart run to Cardiff in 15 min., with a top speed of 62 m.p.h., regained a minute of this, and we arrived little more than a minute late.

"On the next run another of the earlier four-cylinder engines had to haul a substantial load of 380 tons, and was barely able to maintain the overall schedule, unless allowance be made for the Badminton conditional stop. Excellent running was, however, made to Badminton, the net time for the 100 miles being exactly 100 min. Speed was 67½ at West Drayton and 68 at Twyford, the same two slacks as on the first run bringing us down to 44 and 27 m.p.h. respectively. We regained 60 m.p.h. at Pangbourne, and speeds were then 66 at Didcot, 63 at Uffington, and 70 before and after Wootton Bassett. It was a little disappointing, however, that we fell to 44 m.p.h. on the ascent to Badminton. The running was also moderate down to Stoke Gifford, with a maximum rate of 67 m.p.h., and we did not exceed 73 down to the tunnel. We surmounted the 1 in 90 at 32 m.p.h., and recovered to just over 60 at Llanwern.

"*Kenilworth Castle* had a similar train, though somewhat more crowded, on run No. 6. With 385 tons and without delay of any kind, we reached Badminton in 99 min. 5 sec. But the start was extraordinarily leisurely; we had not risen above 53 m.p.h. at Southall, and did not cross the 'sixty' line till twelve miles out. Then, however, we ran magnificently, covering the 71·2 miles from Slough to Little Somerford in 64 min. 10 sec., Wootton Bassett slack

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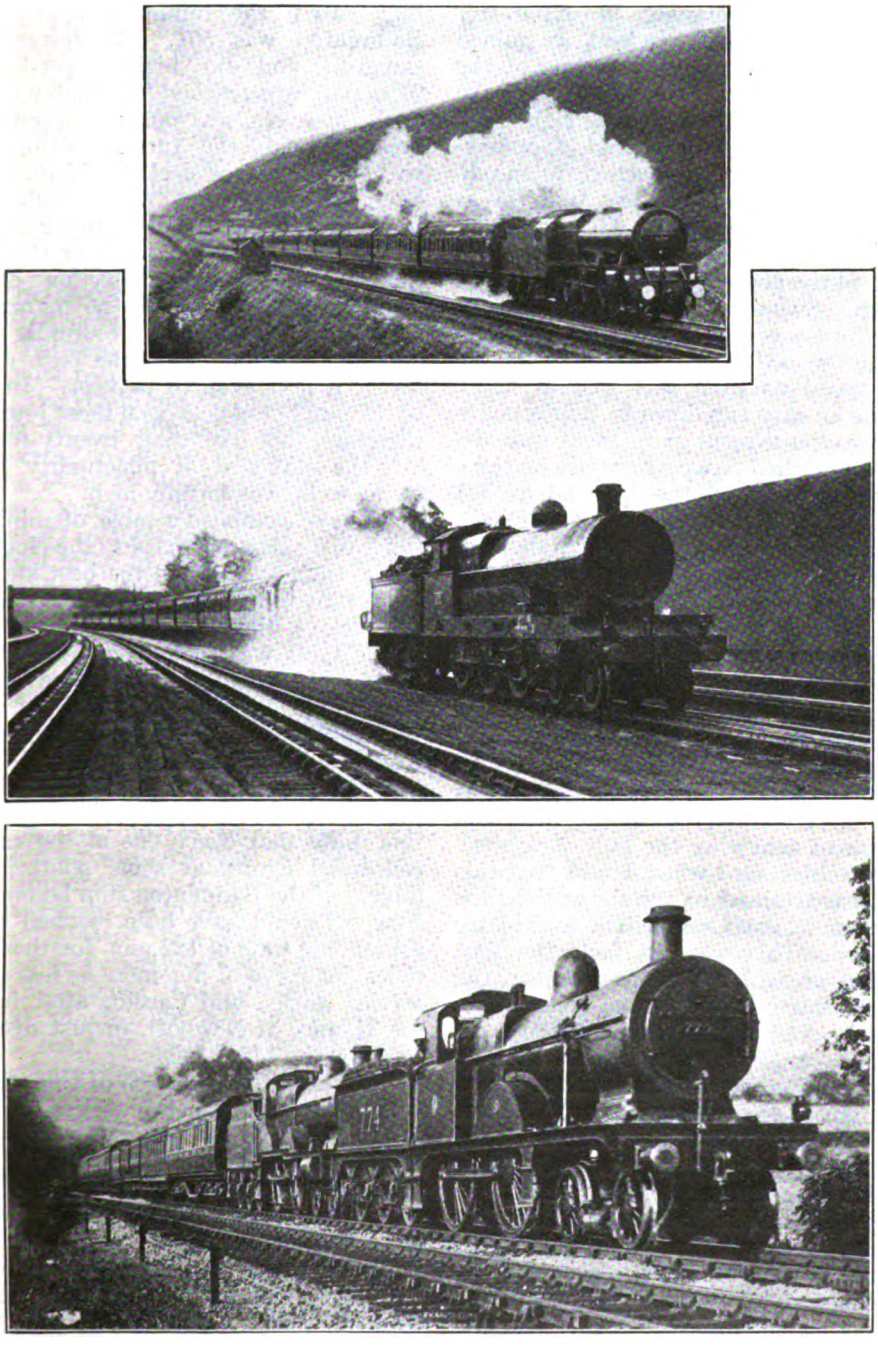

**1. UP " ROYAL SCOT " TAKING WATER AT TEBAY TROUGHS, L.M.S. 4-6-0 No. 6136, " GOLIATH."**
*Photo. Leslie J. Thompson.*

**2. NORTH WALES NON-STOP EXPRESS TAKING WATER AT BUSHEY TROUGHS, L.N.W. 4-6-0 No. 668 " RUPERT GUINNESS."** *Photo. H. Gordon Tidey.*

**3. MANCHESTER-ST. PANCRAS EXPRESS NEAR AMBERGATE, MIDLAND. 4-4-0's Nos. 774 AND 1091**
*Photo. W. Leslie Good.*

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included, and averaging 70 m.p.h. for 36 consecutive miles. Indeed, we gained practically seven minutes on one of the fastest bookings in the world over so long a distance, between Slough and Badminton and with a load approaching 400 tons. Speed reached 70 m.p.h. at Maidenhead, and no less than 74 at Goring on a level road. The minimum at Uffington was 66, and we had regained 69 at Shrivenham before easing slightly through Swindon. Maximum rate at Somerford was 66, and the minimum to Badminton 53½, the engine now having been eased as time was well in hand. Despite an easy run down to Winterbourn and two subsequent permanent-way delays, we reached Newport exactly on time, having surmounted the 1 in 90 at 30½ m.p.h. and regained a speed of 65 m.p.h. at Llanwern. Finally, by maintaining a mile-a-minute rate beyond Newport, we contrived to reach Cardiff nearly a minute early with one of the biggest loads in the table.

"The feature of run No. 7 was the extraordinary time of 5 min. 15 sec. for the 5·5 miles from Severn Tunnel East Box to Severn Tunnel Junction, of which three are adversely inclined at 1 in 90. *Abbotsbury Castle* had the distinction of achieving the only "eighty" in the tables, and when I add that this speed was attained in the abysmal depths of the tunnel itself, you will be sufficiently surprised. This was, in fact, the first occasion on which I ever remember the long descent into the tunnel being taken so freely, and it was an electrifying experience. In consequence, we actually surmounted the western ascent at a minimum of 45 m.p.h. with our 385 tons, and the driver had to slacken speed sharply over the junction. On this occasion speed reached 69 m.p.h. at Slough, did not fall below 67 in Sonning Cutting, and was sustained at 70 for some distance beyond Reading. We were still travelling at 67 when we encountered two permanent-way checks, to 30 and 38 m.p.h. respectively, at Didcot and Steventon, and the subsequent running, hampered by a further check to 50 m.p.h. at Brinkworth, was not quite so fast. Speed rose slowly to 66 at Swindon and 69 beyond Wootton Bassett, the junction again being taken at an unusually high rate; the minimum approaching Badminton was 50½. The restart was sluggish, and no higher speed than 67 m.p.h. was reached at Winterbourne. Such, however, was our subsequent progress through the tunnel section that without the Magor slack we should barely have exceeded the 37-min. allowance to Newport. Nevertheless, the run makes it clear that this booking over the most difficult and congested section of the journey leaves absolutely no margin for recovery, and demands the utmost nerve and good judgment on the part of the driver if it is even to be kept. In view of the number of delays on these journeys, therefore—no less than twenty-four in all—the standard of punctuality seems to me to be wonderfully high.

"I have compiled a table of minimum times to display more clearly the character of the running. As all the best starts in these runs were hampered by permanent-way delays, the start to Slough included in the table was that made by *Hampton Court* with 310 tons on one of my earlier runs on the same train, the log of which was published by you in your article in April, 1927. Otherwise the times are compiled *from these runs alone*, and it is significant of the general performance over this route that every one of the engines concerned figures at some point in the table. If the Badminton stop be omitted, Newport could have been reached in the astounding time of 122 min. for the 133·4 miles, inclusive of five more or less severe service slacks, and Cardiff, after halting for 3¼ min. at Newport, in just over 139 min. for the 145·4 miles.

"Brilliant though much of this running was, I think the general level of the work of the 'Castles' is overshadowed by that of the two-cylinder engines on the 10.15 a.m. up. It should be made clear, however, that whereas the 'Castles' always gave the impression of achieving their lightning times with superlative ease, the 'Saints,' which had worked right through from Swansea, were obviously being worked almost at their limit for hours on end, and the marvel is that the engines stand such apparently merciless driving without ill effect. I have already emphasised the severity of the twenty-mile ascent out of the tunnel to Badminton, with its seven miles at 1 in 100, broken

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only by a short stretch of level through Pilning station. The descent to Somerford affords a little respite, but after that the engine has no relief whatever right through to Paddington when such loads as are seen in the second table have to be hauled; and in these circumstances a level road is a more severe tax on the steaming powers of an engine than an undulating road with a proportionately slower schedule.

"The second series of runs opens with three journeys that were fairly free from delay between Newport and London, and the loads being the least onerous in the table, the conditions of running were less severe than in the later journeys. *Guy Mannering* on run No. 8 reached 59 m.p.h. on the level to Magor, slacked to 28 at Severn Tunnel Junction and did not exceed 63 in the tunnel. At Pilning the rate had fallen to 31 m.p.h., but the short 'breathing space' brought us up to 38½; the final three miles at 1 in 100, in which the high exposed embankment followed by the clammy interior of the Patchway tunnel are always additional handicaps to the engine, brought us down to 25½. Up the ensuing 1 in 300 speed rose to 47½ at Winterbourne and 51½ at Chipping Sodbury, but was eased to 44½ up the last mile or so to Badminton; 71 m.p.h. was reached at Somerford, Wootton Bassett was passed at 53½ and the rate then rose to 64 at Shrivenham and 70 at Didcot. Time being well in hand, the engine's efforts were somewhat relaxed as far as Reading, where the rate had fallen to 55½ m.p.h., but a renewed burst of speed took us through Maidenhead at 70, whence speed fell gradually to 61½ at Southall.

"*Lady Superior* made a faster passage through the tunnel, slacking to 33 at the junction and reaching 71½ at the foot of the decline. Minima at Pilning and Patchway were 33½ and 23½ respectively. Then followed a wonderful acceleration up the 1 in 300, speed reaching 50 m.p.h. as early as Winterbourne, and actually rising to 56 between Coalpit Heath and Sodbury —with 385 tons. Once again the engine was eased through Sodbury but we reached 74 m.p.h. at Somerford, passed Wootton Bassett at 50 and attained 70 at Wantage Road and from Didcot to Cholsey. Speed subsequently lay between 60½ and 66½ m.p.h., but sufficient time was in hand to meet the concluding delays. *The Abbot* on his first journey made the only run that could be called dull. Without the permanent-way check time would not have been kept from Cardiff to Newport, and the ensuing running to Badminton showed a reluctance on the part of the driver to let the engine 'have his head.' From Badminton to Reading speed averaged 61 m.p.h., but a better effort was then made and we covered ten level miles at an average of 70 m.p.h. with our load of 385 tons. So, despite a permanent-way check at Old Oak, our overall time was just within schedule, station time having been economised at Newport.

"On his next journey, however, *The Abbot* made a superb run, the engine's effort being sustained without a break throughout the journey. A speed of 59 m.p.h. was reached at Magor and we slacked to 33½ at Severn Tunnel Junction. A cautious descent into the tunnel, however, heralded a very severe permanent-way repair check to 16 m.p.h. right at the foot of the long 1 in 100 climb. Owing to the wet state of the rails in the tunnel the driver had an anxious time in getting his big train of 390 tons properly on the move again, but we slowly gathered speed, passing Pilning at 22 m.p.h. and Patchway at 23, with an intermediate recovery to 35½. We then worked up to 51 at Chipping Sodbury, falling back slightly to 47½ at Badminton. The engine was not spared on the ensuing descent, and mile after mile was covered at a sustained 79 m.p.h. Seven succeeding adverse miles at 1 in 300 did not bring us below 57, but as we swung over the junction at Wootton Bassett the exhaust from the engine sharpened into an audible roar, significant indeed from a Great Western 4-6-0. In the next 5½ miles to Swindon, despite a faintly *rising* grade, we accelerated to 65 m.p.h. At Shrivenham the rate was 71 m.p.h. and at Uffington no less than 74 and it was still rising when we were suddenly brought to a crawl over a culvert under repair at Challow. This, and the signal check at the same spot in run No. 13, were two of the most tragic delays I have ever encountered. But by a marvellous acceleration this heavy train was worked up to the mile-a-minute rate in less than four miles and at Didcot we

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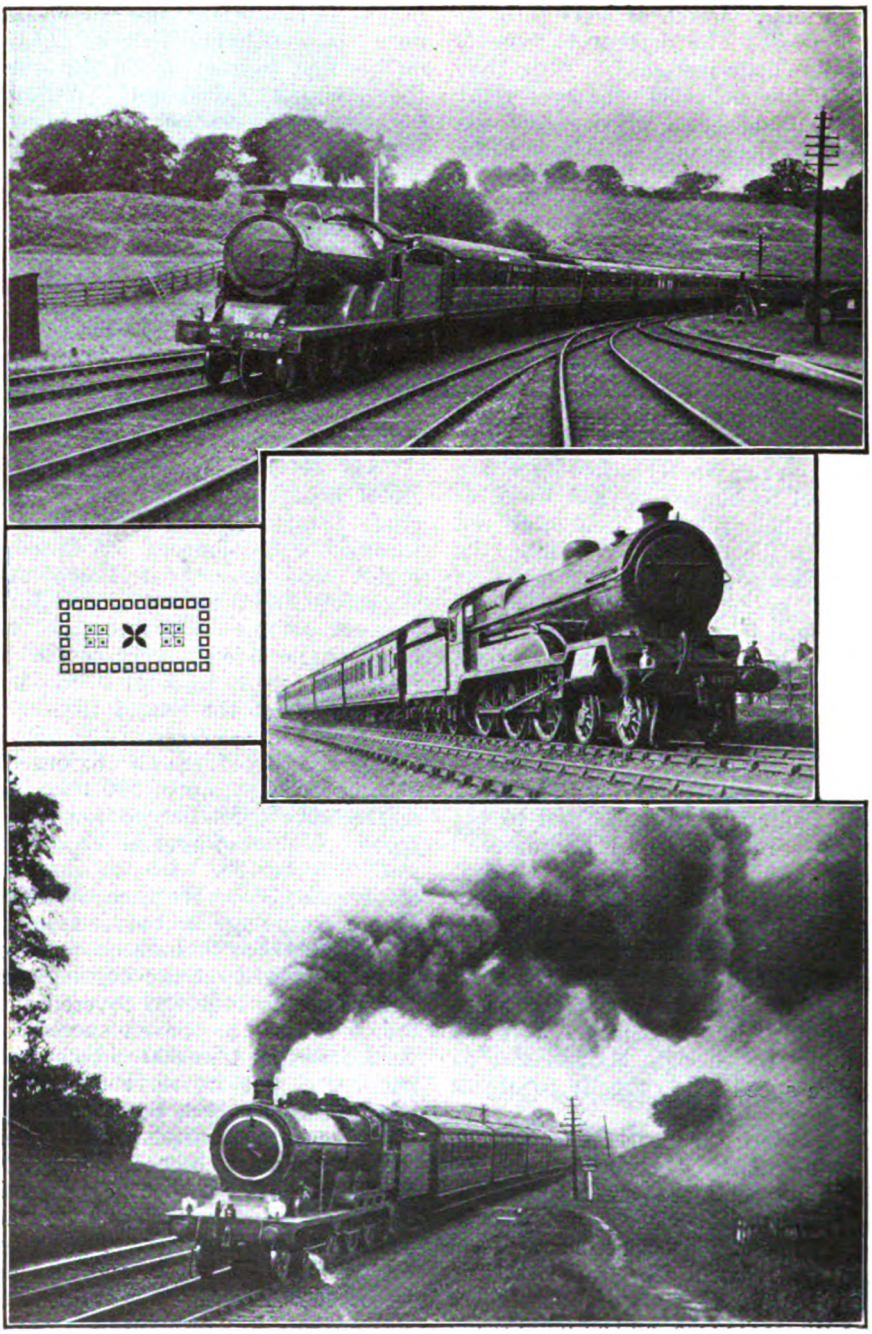

1. SCARBOROUGH-LONDON EXPRESS NEAR KIRKHAM ABBEY, N.E. 4-4-0 No. 1246.
*Photo. H. Gordon Tidey.*

2. MANCHESTER-CLEETHORPES EXPRESS NEAR WORKSOP, G.C. 4-6-0 No. 6167.
*Photo. P. Ransome Wallis.*

3. LONDON-YARMOUTH EXPRESS, G.E. 4-6-0 No. 8503.
*Photo. H. Gordon Tidey.*

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had regained a speed of 72 m.p.h. At Pangbourne the rate had dropped to 66; three miles further on it again reached 70 and remained at this rate through Reading. Then after a brief fall to 68 in Sonning Cutting there came the culminating effort to 69 at Twyford, 72 at Taplow and 73 at Slough, while, after a fall to 67 at West Drayton, a final burst to 69 through Acton and a fast finish into the terminus rounded off a very wonderful performance. Indeed, a net time of 136½ min. from Newport in this direction of running and with a load of 390 tons seems to me an altogether extraordinary achievement for a 25-year-old locomotive.

"On run No. 12 the load had increased to 420 tons—fourteen vehicles well filled. Yet the running of *Saint Sebastian*, especially in the early stages, seemed unaffected by the heavier train. Indeed, right through to Reading, aided by an absence of checks, the times are in advance of any in the table, while the first stage to Stoke Gifford was clearly the fastest. Splendid starts were made both from Cardiff and Newport, speeds being 59 m.p.h. at Marshfield and 58 at Magor. In the tunnel 66 was the maximum rate, but an excellent climb followed, speed being 31 at Pilning, actually recovering to 40½ on the short level, and falling finally, after some slipping in Patchway tunnel, to 24 m.p.h. We accelerated up the 1 in 300 with characteristic vigour, reaching 52 at Chipping Sodbury and passing Badminton at 49. The maximum at Somerford was 75 m.p.h. and the minimum at Wootton Bassett again 57. Speed then rose gradually to 69 at Steventon, but was eased to 61 by Pangbourne. From the check at Reading we made a further fine recovery to 70 m.p.h. at Maidenhead and 71 at Taplow, after which the rate fell to 62 at Southall, as time was well in hand.

"*Robin Hood*, with an even heavier load, practically reproduced *Saint Sebastian's* running to Badminton, the extra ¾-minute being due to the lower rate at which Severn Tunnel Junction was passed (25 against 36 m.p.h.) and a slightly slower recovery on the Pilning level. The actual acceleration up the 1 in 300 was a little faster, but the maximum rate at Sodbury (52 m.p.h.) was the same on that run. Following a top speed of 73 m.p.h. at Somerford there came a severe permanent-way check to 10 m.p.h. in Brinkworth station, from which speed recovered up the 1 in 300 to 40 m.p.h. at Wootton Bassett. Fine work was performed once again on to London; at Swindon the rate was 67 and at Uffington 71, but our steady acceleration was cut short by the exasperating signal check to 37 m.p.h. at Challow, already mentioned. Nothing daunted, our driver worked his engine up to 62 m.p.h. at Wantage Road, 71 at Didcot and no less than 73 on a level track at Cholsey—all this with 425 tons and a two-cylinder 4–6–0. Speed fell slightly to 69 at Pangbourne but increased to 70 through Reading; a sudden easing through Twyford, however, preceded a further signal check to 32 m.p.h. Nevertheless, we recovered steadily to 67 m.p.h. at Ealing Broadway, but final signal checks and a dead stand at Royal Oak, from which curiously enough the driver had the greatest difficulty in starting the train, made us 8 minutes on arrival.

"Lastly we come to the herculean achievement in column 14. I had occasionally seen engines of this class stagger into Paddington with loads approaching 500 tons, but never should I have imagined that under such conditions they could, for instance, run up from Swindon start-to-stop in under 'even time,' still less maintain an average of precisely 70 m.p.h. over 25 consecutive and practically level miles, as did *Lady of the Lake* on this memorable occasion. Sixteen vehicles composed our train, weighing 449 tons tare; and as almost every seat was occupied the gross load was not less than 485 tons. A wonderful start was made from Cardiff, the time to Marshfield actually being the lowest in the table, and a sustained speed of 62 m.p.h. enabled us to curtail the sharp 16-min. booking to Newport. Restarting we passed Llanwern at 53 m.p.h. and Magor at 59, but at Severn Tunnel Junction it was necessary to stop for pilot assistance, in view of the climb out of the tunnel. A 2-6-2 tank engine was quickly attached and the two engines made some splendid running up to Badminton. Attaining 65 m.p.h. in the tunnel we passed Pilning at 36; no less than 45½ was regained on the short level and the rate did not fall below 31 at Patchway. Speeds

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were then 45½ at Stoke Gifford, 54 at Coalpit Heath and 56 at Chipping Sodbury, but we were unfortunately brought to a dead stand for signals in Badminton station. Subsequently 67 m.p.h. was attained at Somerford and after passing Wootton Bassett at 53½ we had regained 61 before stopping at Swindon to detach the pilot.

"At this point a locomotive inspector joined the engine crew. The running from Swindon to Reading, where we had actually improved on the booking of the 75-minute 'flyer,' was really superlative. The mile-a-minute rate was attained before passing Shrivenham, the first station out of Swindon; at Uffington the speed was 66 m.p.h., at Challow 68, at Wantage 69, at Steventon 72 and at Cholsey 73, so far as I know a record speed on a level track for any unaided engine of comparable dimensions with so tremendous a load. At Pangbourne the rate was 68 m.p.h., at Tilehurst 70, and on passing Reading, 41·3 miles from the start, in 39 min. 45 sec., we had covered, as I have said, 25 miles at an average rate of 70 m.p.h. I think we could possibly have kept the 75-minute booking to Paddington with a continuance of the same effort, but the driver now eased his engine. The rate fell to 62½ in Sonning Cutting, recovered to 67 at Maidenhead, gradually dropped to 60½ at Southall and rose finally to 65 at Acton, and we stopped in Paddington station exactly 76 minutes after leaving Swindon. Fifty consecutive miles were covered on this occasion with our load of 485 tons at an average speed of 67½ m.p.h., and the run is, I think, a fitting climax to the series.

"It is not possible to show a net running time in this case, for if *Lady of the Lake* had succeeded in lifting her 485-ton train out of the depths of the tunnel without assistance, it is tolerably certain that there would have been loss of time to set against the gain from Swindon to Paddington. So consistent was the running throughout this second series of journeys that the minimum times (excluding the piloted portion of the last run) total only 2 min. less than the net time on *The Abbot's* second trip, that is, 134½ min. for the 133·4 miles from Newport, and I have not thought it worth while to compile a separate table of minima in this case."

By way of "stop press" news, my correspondent sends, too late for tabulation, details of yet another up run on the 10.15 a.m. from Cardiff, during the Christmas holidays, wherein No. 2942 *Fawley Court*, another 2-cylinder 4-6-0, had to handle a train of no less than 479 tons tare and 520 tons full. Stopping at Badminton in this instance to detach the pilot, *Fawley Court* worked this enormous load thence to Paddington in exactly 105 min., despite a very cautious slowing to 45 m.p.h. at Wootton Bassett, and a severe p.w. slowing at Westbourne Park. Net time from Badminton to town was 103¼ min.; actual subsequent times were 77½ min. from Swindon, 54¾ min. from Didcot, 38 min. 50 sec. from Reading, and 21¾ min. from Slough, from which 1¾ min. should be deducted to arrive at the net times. Acton, 95·8 miles, was passed in 97 min. 30 sec. from the start, and the distance of 90 miles from Hullavington to this point was run in 88 min. precisely. "But why on earth," my friend concludes, "a tired old 'Saint' to haul 520 tons on such a booking as this?" The question is beyond my ability to answer!

I doubt whether anything can usefully be added to my correspondent's justifiable eulogy of the magnificent locomotive work which he has thus set so enthusiastically on record. Weight for weight, even the latest "Kings" would find difficulty in rivalling some of the extraordinary efforts here detailed of the 75-ton 2-cylinder 4-6-0's, some of them with a quarter-of-a century of hard travelling to their credit. But I still join issue with my friend in his contention that the faster the scheduled speed, the worse the punctuality. The fastest bookings on this very South Wales service are all in the down direction, and yet the standard of punctuality is considerably higher on westbound than on eastbound trips, in my experience as well as his. On my latest journeys over this route, which have been fairly numerous, though incorporating nothing worthy of special record in comparison with the trips tabulated in this article, the arrivals at Newport have been uniformly punctual, but not so the up runs.

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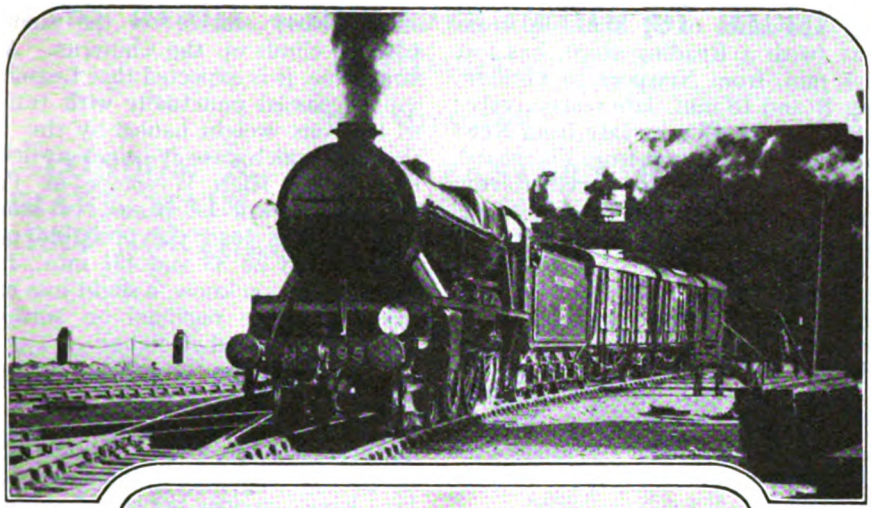

1. UP CONTINENTAL EXPRESS LEAVING DOVER MARINE STATION. FOUR-CYLINDER 4-6-0 No. E851, "SIR FRANCIS DRAKE." *Photo. A. C. Wright.*

2. VICTORIA EXPRESS AT WORTHING. 4-6-0 No. E798, "SIR HECTIMERE." *Photo. H. M. Madgwick.*

3. DOWN AFTERNOON CONTINENTAL EXPRESS. "KING ARTHUR" CLASS 4-6-0. *Photo. H. Gordon Tidey.*

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The 8.15 a.m. up from Cardiff, despite the easy allowance of 2¾ hours up from Newport (with a Reading stop), has lost 5 and 7 min. from Newport to London, arriving 8 and 18 min. late respectively; the 6.15 a.m. up, 47 min. late from Newport owing to a late start from Fishguard, lost 5 min. more, despite excellent running, the loss being entirely due to a time of 31¼ min. over the 20½ miles from Steventon to Reading, badly signal-checked throughout, but for which we might have gained 7 or 8 min. easily; and, last of all, a run on my correspondent's 10.15 a.m. up, with a 395-ton load, wherein we left Newport 4 min. late, reached Paddington 17 min. late. This last was the only trip on which I doubt if our 2-cylinder 4-6-0 would have kept time, even apart from the many delays which we experienced.

Before I conclude, I must refer briefly to a couple of letters I have received bearing on the comparison I made in the December article between the maximum rostered loads of the Great Western "Kings," the L.M.S. "Royal Scots," and the L.N.E.R. "Pacifics," respectively. In regard to the "Kings," Mr. A. V. Goodyear, the well-known Great Western authority, writes: "Although you quoted correctly the limits of load for the 'King' class over various sections of the West of England route, some explanation seems desirable. Early in 1927, an official notice was issued dealing with standard loads. In giving the limit loads for each class of passenger engine over sections of fairly uniform gradient, the memorandum emphasised that, with train-loads up to the figures given, '*standard point-to-point timing is to be maintained.*' Slight additions to schedule are permitted over certain difficult sections when loads are increased above the standard; but this does not warrant a corresponding extension of end-to-end journey time in every case. For instance, the load for the 'Star' class over the Paddington-Birmingham route is the modest figure of 320 tons. With trains up to this weight, drivers of 'Star' class engines are expected to adhere strictly to the schedule times in the early stages, on the somewhat arduous climb up the Chilterns. At the same time, it is expected that Leamington will be passed punctually with trains up to 420 tons' weight hauled by the 'Star' class, in which case it is not anticipated that either High Wycombe or Princes Risborough will be passed to schedule. With such a load the probable passing times would be 33 and 43½ min., respectively. As you know, a slight loss of time can readily be regained on subsequent favourably graded stretches.

"To revert to the official notice, the standard load for a 'Star' between Taunton and Whiteball is rated at 392 tons; and from Newton Abbot to Brent 288 tons. At present, I have not the standard load for 'King' engines between Taunton and Whiteball, but up the steeper ascent of 1 in 75 from Bristol start to passing Filton, the 'Kings' are deemed capable of maintaining the standard point-to-point timing with 460 tons, this figure being increased to 500 tons as the loading from Filton to Paddington, on a schedule averaging over 60 m.p.h. throughout. It seems somewhat strange, therefore, that on the authority of this official book the 'Kings' should be credited with no more than 360 tons as the maximum load from Taunton to Whiteball, though they may take the same weight over the far heavier grades west of Newton Abbot." The only authority I had for the statement I made in December was, of course, the Great Western book "The King of Locomotives," to which I referred, where the facts were given without qualification; but I am very glad to receive, and to give publicity to, my correspondent's explanation. At the moment of going to press, I learn that the rostered maximum tare for "Kings" on standard timings over Whiteball is 460 tons—not 360 tons—so that the correct figures are, therefore, 495 tons from Paddington to Taunton, 460 tons thence to Newton Abbot, and 360 tons from Newton Abbot to Plymouth. This clears up the difficulty.

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# The Main Line Gradients of British Railways.

By "VOYAGEUR."

## II.—LONDON & NORTH EASTERN RAILWAY SUBSIDIARY MAIN LINES AND PRINCIPAL BRANCHES, GREAT NORTHERN SECTION AND NORTH EASTERN AREA.

IT has not been easy to make the selection of the various branches and subsidiary main lines of the Great Northern Section and North Eastern Area of the L.N.E.R. for the purpose of these articles. It was laid down in the first instalment that the lines would figure over which express running was habitually performed; but there are various other sections of the areas concerned which strictly come under this description. For instance, the Lincolnshire lines of the Great Northern section see some fairly fast running, though with frequent intermediate stops; in the North Eastern Area the lines from Hull to Scarborough and from York to Hull might also have been included, or that from Newcastle to Carlisle. On the other hand, the inclusion of such a length as Shaftholme Junction to Harrogate, with only one daily fast train throughout, may be questioned; here the ruling consideration was the recent non-stop running between King's Cross to Harrogate of the "Queen of Scots Pullman," by this route, until its diversion *via* Leeds, and the possibility of such a journey being reinstated in the future. In the circumstances it has been necessary to confine the profiling to those routes most closely comparable with the main lines in regard to the nature of the express locomotive work performed over them. It may be added that, except for the profile from Doncaster to Bradford, none of the profiles reproduced in this article have been published previously.

### *DONCASTER TO LEEDS AND BRADFORD.*

It is the heavy character of the grading of the West Riding main line, between Doncaster and Leeds, which renders necessary the rigid limitation of the loads of the "West Riding Pullman" and the "Queen of Scots Pullman" to a maximum of eight Pullmans between London and Leeds, the existence of certain weak underbridges on this section forbidding, at the same time, the use of any more powerful locomotives than Ivatt "Atlantics" and 4-4-0 "Directors" and "Shires." There are considerable stretches of 1 in 150 from Doncaster to Wakefield, while between there and Leeds the ruling grade steepens to 1 in 100, with a lengthy ascent from both directions to a summit point at Ardsley, save for a short and even steeper 1 in 50 ascent out of Holbeck in the south-bound direction. Whether towards Wakefield or towards Bradford, the start out of Holbeck is in either case at 1 in 50, making a very difficult exit for trains leaving Leeds, the majority of which stop at Holbeck. As is well known, a large share in the working of express trains between Doncaster and Leeds is taken by the Gresley "Moguls," which make light of such inclines.

Practically the only working with express locomotives over the Leeds and Bradford line is that of the L.M.S. Central Division expresses on the Manchester service, as far as the junction at Laisterdyke, and here also the L.M.S. Company is compelled to restrict its locomotive power to "Princes" or "Atlantics," as the bridges will not permit the use of the 4-6-0 "Class 8" locomotives. Most of the L.N.E.R. trains are horsed by 0-6-2 and 4-4-2 tank engines. The Bradford and Halifax section of the "West Riding Pullman," as well as the through Bradford coaches off the other London expresses, do not travel *via* Leeds, but by the direct route from Wakefield *via* Morley.



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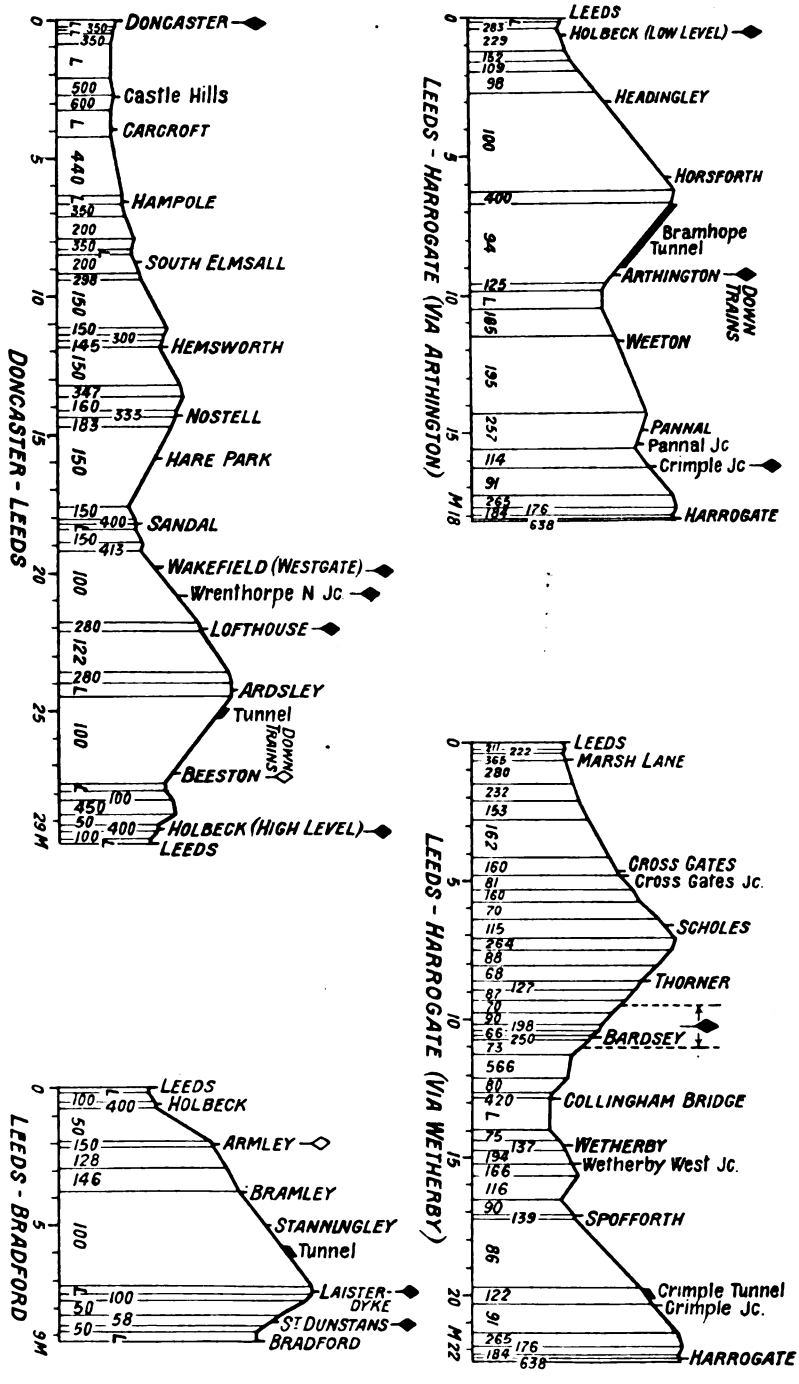


SHEET 5.—GRADIENT PROFILES, LONDON & NORTH EASTERN RAILWAY.

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### *LEEDS TO HARROGATE.*

There are two routes from Leeds to Harrogate. The older involves the use of L.M.S. metals through Holbeck to Wortley Junction, and it was doubtless for this reason that the North Eastern constructed their later independent route, branching from the Leeds and York line at Cross Gates, and joining the Church Fenton to Harrogate line near Wetherby. The former, with its 5-mile climb to Moseley, (276 ft. above Leeds New station) chiefly at 1 in 100, and its 3½ miles down, mostly at 1 in 94, to Arthington, is bad enough, but it pales altogether before the severity of the latter, with a stiff climb out to Scholes, partly at 81 and 70, and the still steeper 5½ miles from there down to Collingham Bridge, for nearly 4 miles ranging chiefly between 1 in 68 and 88. The rise from Leeds to Scholes summit covers 256 ft., and the subsequent fall 280 ft., difference in altitude. Then, to make matters worse, the Wetherby route rises another 286 ft. from below Spofforth to Harrogate, by means of 5 miles ascending almost entirely at 1 in 86-91. In earlier days, the Arthington route continued on to Ripon *via* Starbeck, which was the station for Harrogate, and at a considerably lower level, but on the completion of the line from Church Fenton to Harrogate, a connecting spur was laid from Pannal Junction up to Crimple Junction, bringing the trains from the Arthington direction on to the 1 in 91 over Crimple Viaduct, and so up into Harrogate. The extra 4¼ miles of the Wetherby route, in addition to its terribly difficult grading, make it a poor exchange for the Arthington route, but certain of the through express trains between Liverpool, Manchester and Newcastle are scheduled to make use of the former.

### *DONCASTER TO HARROGATE.*

It is on the north side of Wetherby that express trains using this approach to Harrogate encounter severe gradients, as at Wetherby West Junction they join the Wetherby route just mentioned from Leeds to Harrogate ; elsewhere the chief hindrance lies in the number of service slacks, those at Knottingley and Church Fenton being exceedingly severe, while there are other substantial reductions of speed to be made at Shaftholme Junction, Ferrybridge, Burton Salmon and Tadcaster. The most singular feature of this journey is the use of L.M.S. metals between Shaftholme Junction and Knottingley.

### *HARROGATE-STOCKTON-WEST HARTLEPOOL-SUNDERLAND-NEWCASTLE.*

This is the route followed by the Liverpool-Newcastle through trains previously mentioned ; from Harrogate to Northallerton it is also used by the Pullman expresses to and from Newcastle. There is a remarkably fine start northwards from Harrogate, falling at 1 in 66 straight out of the platform for over 1½ miles, and then at varying grades for 7¾ miles further, but this is seldom taken advantage of for the development of very high speeds. From Ripon the grades are very moderate to Stockton, except, perhaps, for the 3 miles falling at 1 in 170 to the viaduct over the Tees valley at Yarm ; and with no other hindrances than service slacks, both fairly severe, at Northallerton Low Junction and Eaglescliffe, it is rather difficult to understand the reason for such leisurely bookings as 57 and 58 min. over the 43 miles from Harrogate to Stockton with one stop, at Ripon, and 57 min. non-stop in the reverse direction. Beyond Stockton the easy grading conditions continue to West Hartlepool, which has to be approached at very low speed from both directions over some reverse curves of exceptional sharpness ; but the coast section from West Hartlepool to Sunderland incorporates steep switchback grades, and is difficult from the running point of view. The Harrogate, Stockton and Sunderland route from Leeds to Newcastle (103 miles) is actually 2½ miles shorter than that by York (105½ miles), but in point of time, because of the severity of its gradients, is far slower, the best train taking 2 hr. 53 min., as against 2¼ hr. by the York route. The most direct route of all is from Leeds through Harrogate to Northallerton, and thence over the main line through Darlington to Newcastle, which is 93½ miles in length ; the " Pullmans " are so routed, the best Pullman timing being 2 hr. 6 min. from Leeds to Newcastle.

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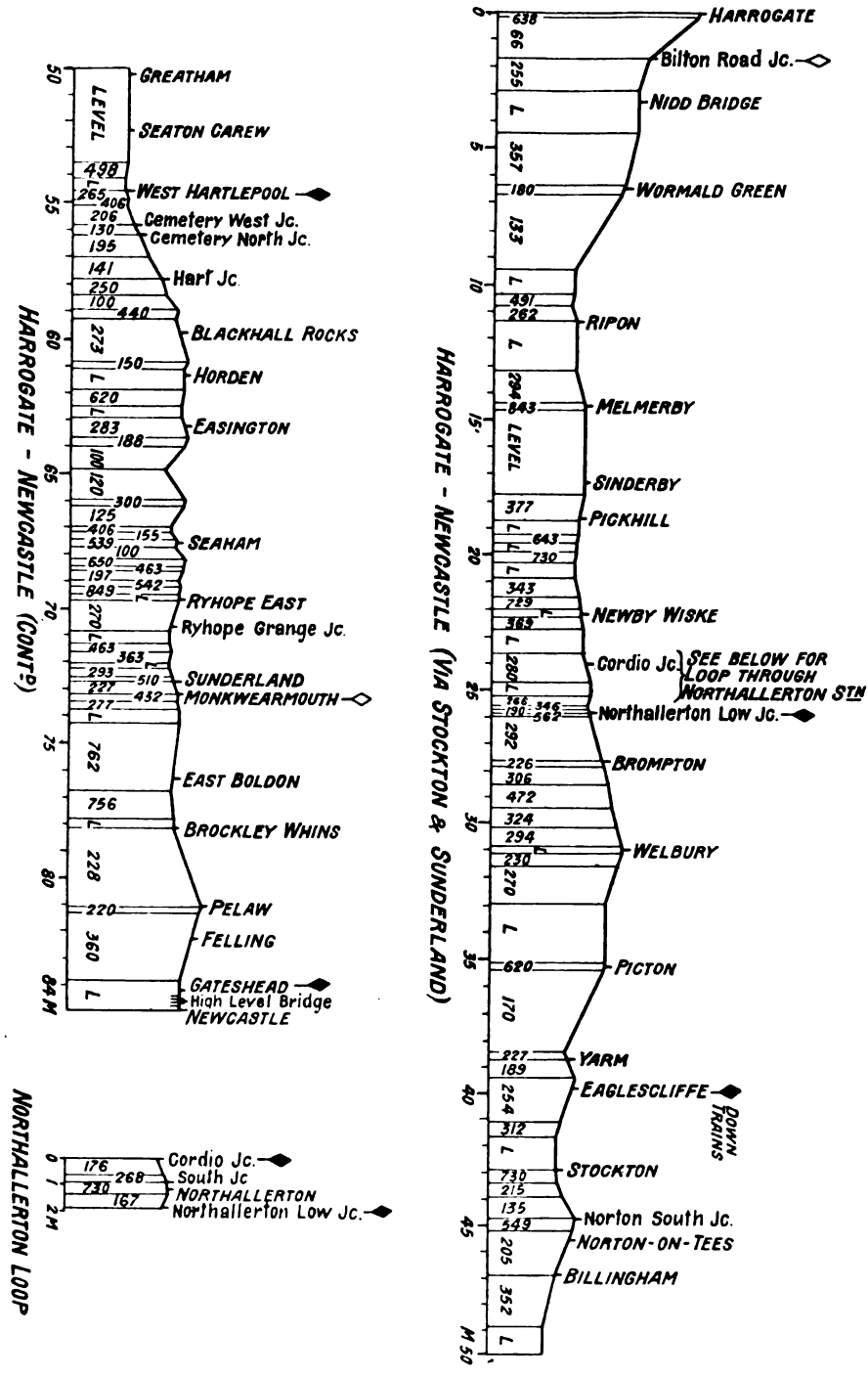


SHEET 6.—GRADIENT PROFILES, LONDON & NORTH EASTERN RAILWAY.

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### *LEEDS TO SELBY AND HULL.*

Much the worst obstacle between Leeds and Hull is the 6¼-mile ascent from Gascoigne Wood Sidings to Garforth, entirely at 1 in 136—150, with the somewhat easier descent to Leeds, including 3 miles at 1 in 153—158. East of Gascoigne Wood, however, the line is practically level throughout, the only hindrance being the slow running through Selby.

### *SELBY TO BRIDLINGTON.*

Normally, only one express train makes use of this route daily, but in summer it is used to a considerable extent by express excursions to and from Bridlington, and is also followed by the through services between King's Cross and Bridlington. The line is level nearly to Market Weighton, but here a service slack precedes a heavy climb into the Yorkshire Wolds, for 5 miles mainly at 1 in 95—100. Then succeeds the longer, but rather more easy and broken descent to Driffield, where there is a second bad service slack, followed by level running to Bridlington. The one-time 73-min. allowance of the down "business" evening express over the 63·4 miles from Leeds to Bridlington, with its average of 52·1 m.p.h., involved some hard running, when the three slacks and the Garforth and Enthorpe Summits are taken into account; but with only one 2-min. stop added—at Driffield—it has now been eased out to no less than 90 min., and the interest of the trip, from the locomotive standpoint, has vanished.

### *LEEDS TO YORK AND SCARBOROUGH.*

The York and Scarborough trains out of Leeds keep company as far as Micklefield, whence the descent to Church Fenton closely resembles that to Gascoigne Wood, making a total of 5¾ miles at 1 in 133—150; it is also customary to moderate the speed through Church Fenton in the eastbound direction. After that there is not a grade worth mentioning the whole way to Scarborough, the Derwent valley having afforded the railway a level passage right through the heart of the Wolds. But it has produced a difficulty of another kind, in that for 5 miles, from Howsham Gates Box to Huttons Ambo, the sharp reverse curves in the track render necessary a continuous speed restriction of 45 m.p.h. Add to this the similar slacks through Malton station and over the Seamer curves, as well as the drastic slowing through York, and the merit of the summer allowance of 75 min. over the 67·6 miles from Leeds to Scarborough, with its average of 54·1 m.p.h., becomes the more apparent. It is pleasant to notice, by contrast with the Leeds-Bridlington slowing, that the Leeds to Scarborough non-stop still retains this fast timing during the summer months.

### DISTANCES.

Names in italics are signal-boxes, the position on up or down side of the line being indicated in each case.

**Doncaster—Leeds (Sheet 5).**

*Mile-posts, down side, from King's Cross (zero) to Leeds.*

| | Miles |
|---|---|
| DONCASTER | 0·0 |
| *Castle Hills Sidings (down)* | 2·8 |
| Carcroft | 4·0 |
| Hampole | 6·5 |
| South Elmsall | 8·7 |
| Hemsworth | 11·9 |
| Nostell | 14·4 |
| Hare Park | 16·9 |
| Sandal | 18·2 |
| WAKEFIELD (WESTGATE) | 19·9 |
| *Wrenthorpe North Junction (up)* | 21·0 |
| Lofthouse | 22·8 |
| Ardsley | 24·2 |
| Beeston | 27·3 |
| Holbeck | 29·3 |
| LEEDS (CENTRAL) | 29·8 |

**Leeds—Bradford (Sheet 5).**

*Mile-posts, down side, Holbeck (zero) to Laisterdyke.*

| | |
|---|---|
| LEEDS (CENTRAL) | 0·0 |
| Holbeck | 0·5 |
| *Wortley West Junction (down)* | 1·3 |
| Armley | 2·0 |
| Bramley | 3·9 |
| Stanningley | 5·0 |
| Laisterdyke | 7·4 |
| *Hammerton Street Junction (down)* | 8·2 |
| St. Dunstan's | 8·9 |
| BRADFORD (EXCHANGE) | 9·3 |

**Leeds—Harrogate, via Arthington (Sheet 5).**

*Mile-posts, down side, Wortley Jc. (zero) to Pannal, and down side, Crimple Jc. (from zero at Church Fenton) to Harrogate.*

| | | |
|---|---|---|
| LEEDS (NEW STATION) | | 0·0 |
| Holbeck | | 0·8 |
| LEEDS (CENTRAL) | 0·0 | |
| *Wortley Junction* | 0·7 | |
| *Wortley Junction (up)* | | 1·0 |
| *Cardigan Road Junction (up)* | | 2·1 |
| Headingley | | 3·1 |
| Horsforth | | 5·7 |
| *Moseley (up)* | | 6·1 |
| Arthington | | 9·3 |
| Weeton | | 11·8 |
| Pannal | | 15·0 |
| *Crimple Junction (up)* | | 16·3 |
| HARROGATE | | 18·2 |

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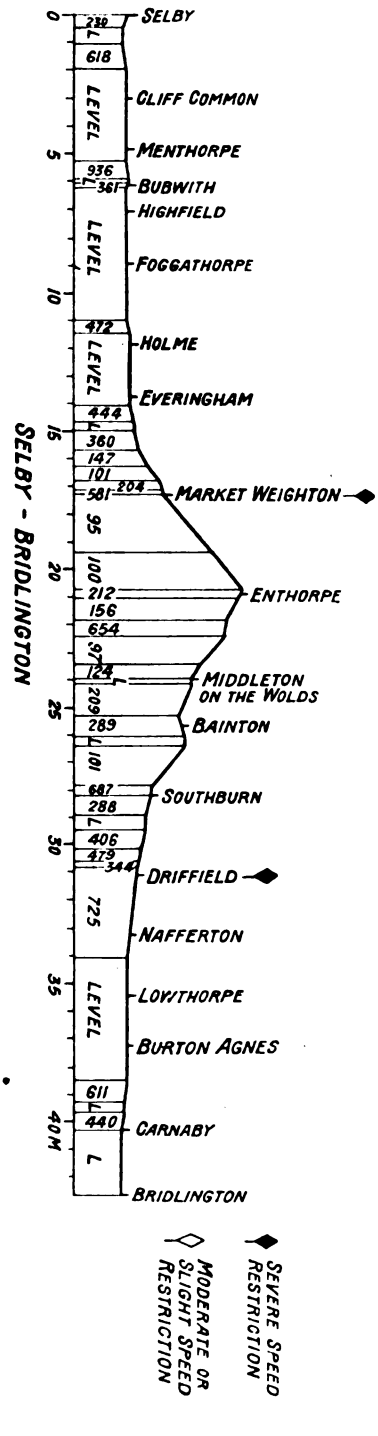


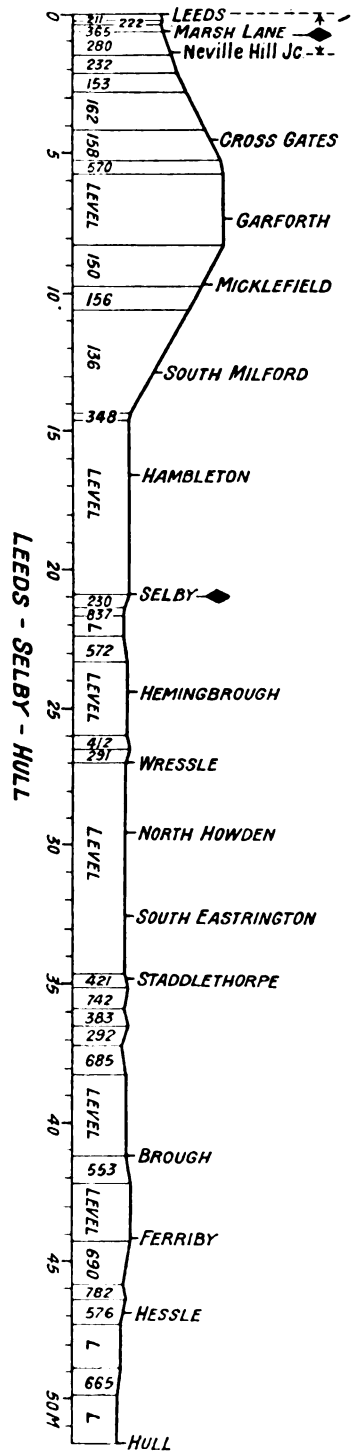


SHEET 7.—GRADIENT PROFILES, LONDON & NORTH EASTERN RAILWAY.

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**Leeds—Harrogate, via Wetherby (Sheet 5).**

*Mile-posts, up (south) side, Leeds to Cross Gates (from zero at Selby) ; down side, Cross Gates (zero) to Wetherby West Jc. ; down side, Wetherby West to Harrogate (from zero at Church Fenton).*

| | |
|---|---|
| LEEDS (NEW STATION) | 0·0 |
| Marsh Lane | 0·8 |
| *Neville Hill Junction (up)* | 1·5 |
| Cross Gates | 4·4 |
| Scholes | 6·6 |
| Thorner | 8·8 |
| Bardsey | 10·8 |
| Collingham Bridge | 12·9 |
| Wetherby | 14·6 |
| *Wetherby West Junction (up)* | 15·2 |
| Spofforth | 17·5 |
| *Crimple Junction (up)* | 20·6 |
| HARROGATE | 22·5 |

**Doncaster—Harrogate, via Knottingley (Sheet 8).**

*Mile-posts, down side, from King's Cross (zero) to Shaftholme Jc. ; up side, Shaftholme to Knottingley ; down side, Ferrybridge to Church Fenton (from zero at York) ; down side, Church Fenton (zero) to Harrogate.*

| | |
|---|---|
| DONCASTER | 0·0 |
| Arksey | 2·1 |
| *Shaftholme Junction (down)* | 4·2 |
| Askern | 6·9 |
| Norton | 8·0 |
| Womersley | 10·6 |
| KNOTTINGLEY | 14·7 |
| Ferrybridge | 15·2 |
| Burton Salmon | 17·8 |
| Monk Fryston | 19·1 |
| Milford Junction | 19·8 |
| Sherburn-in-Elmet | 21·6 |
| CHURCH FENTON | 23·7 |
| Tadcaster | 28·4 |
| Newton Kyme | 30·3 |
| Thorpe Arch | 31·8 |
| *Wetherby West Junction (up)* | 35·5 |
| Spofforth | 37·8 |
| *Crimple Junction (up)* | 40·9 |
| HARROGATE | 42·8 |

**Harrogate—Stockton—West Hartlepool—Sunderland—Newcastle (Sheet 6).**

*Mile-posts, down side, Bilton Jc. to Newcastle (from zero at Wortley Jc., Leeds, via Starbeck).*

| | |
|---|---|
| HARROGATE | 0·0 |
| *Bilton Junction (up)* | 1·7 |
| Nidd Bridge | 3·4 |
| Wormald Green | 6·6 |
| RIPON | 11·5 |
| Melmerby | 14·5 |
| Sinderby | 17·3 |
| Pickhill | 18·6 |
| Newby Wiske | 22·2 |
| *Cordio Junction (up)* | 24·1 |
| NORTHALLERTON STATION | 25·3 |
| *Northallerton Low Jc.* | 25·9 |
| *Northallerton Low Junction (down)* | 25·9 |
| Brompton | 27·6 |
| Welbury | 31·2 |
| Picton | 35·4 |
| Yarm | 38·8 |
| Eaglescliffe Junction | 40·0 |
| STOCKTON-ON-TEES | 43·0 |
| *Norton South Junction (down)* | 44·7 |
| Norton-on-Tees | 45·7 |
| Billingham-on-Tees | 46·7 |
| Greatham | 50·3 |
| Seaton Carew | 52·4 |
| WEST HARTLEPOOL | 54·6 |
| Hart | 57·8 |
| Blackhall Rocks | 59·8 |
| Horden | 60·5 |
| Easington | 63·3 |
| Seaham | 67·5 |
| Ryhope East | 69·7 |
| *Ryhope Grange Junction (down)* | 70·7 |
| SUNDERLAND | 72·7 |
| Monkwearmouth | 73·1 |
| East Boldon | 76·2 |
| Boldon Colliery | 78·1 |
| Pelaw | 81·3 |
| Felling | 82·5 |
| Gateshead East | 84·2 |
| NEWCASTLE (CENTRAL) | 84·8 |

**Leeds to Selby and Hull (Sheet 7).**

*Mile-posts, up (south) side, Leeds to Selby (zero) ; and up (south) side, Selby to Hull (zero).*

| | |
|---|---|
| LEEDS (NEW STATION) | 0·0 |
| Marsh Lane | 0·8 |
| *Neville Hill Junction (up)* | 1·5 |
| Cross Gates | 4·4 |
| Garforth | 7·3 |
| Ridge Bridge | 8·9 |
| Micklefield | 9·7 |
| South Milford | 12·9 |
| *Gascoigne Wood (up)* | 14·3 |
| Hambleton | 16·5 |
| *Wistow Junction (down)* | 20·1 |
| SELBY | 20·7 |
| Hemingbrough | 23·7 |
| Wressle | 26·7 |
| North Howden | 29·3 |
| South Eastrington | 32·4 |
| Staddlethorpe | 34·7 |
| Broomfleet | 37·2 |
| Brough | 41·2 |
| Ferriby | 44·2 |
| Hessle | 46·9 |
| *Hessle East Junction (down)* | 48·4 |
| *Anlaby Road Junction (up)* | 50·8 |
| HULL (PARAGON) | 51·7 |

**Selby—Bridlington (Sheet 7).**

*Mile-posts, down side, Selby (zero at Barlby Jc.) to Market Weighton ; down side, Market Weighton (zero) to Driffield ; down side, Driffield to Bridlington (from zero at Hull).*

| | |
|---|---|
| SELBY | 0·0 |
| Cliff Common | 3·4 |
| Menthorpe Gate | 5·0 |
| Bubwith | 6·4 |
| High Field | 7·3 |
| Foggathorpe | 9·1 |
| Holme Moor | 12·1 |
| Everingham | 14·0 |
| MARKET WEIGHTON | 17·5 |
| Enthorpe | 21·1 |
| Middleton-on-the-Wolds | 24·2 |
| Bainton | 25·8 |
| Southburn | 28·3 |
| DRIFFIELD | 31·3 |

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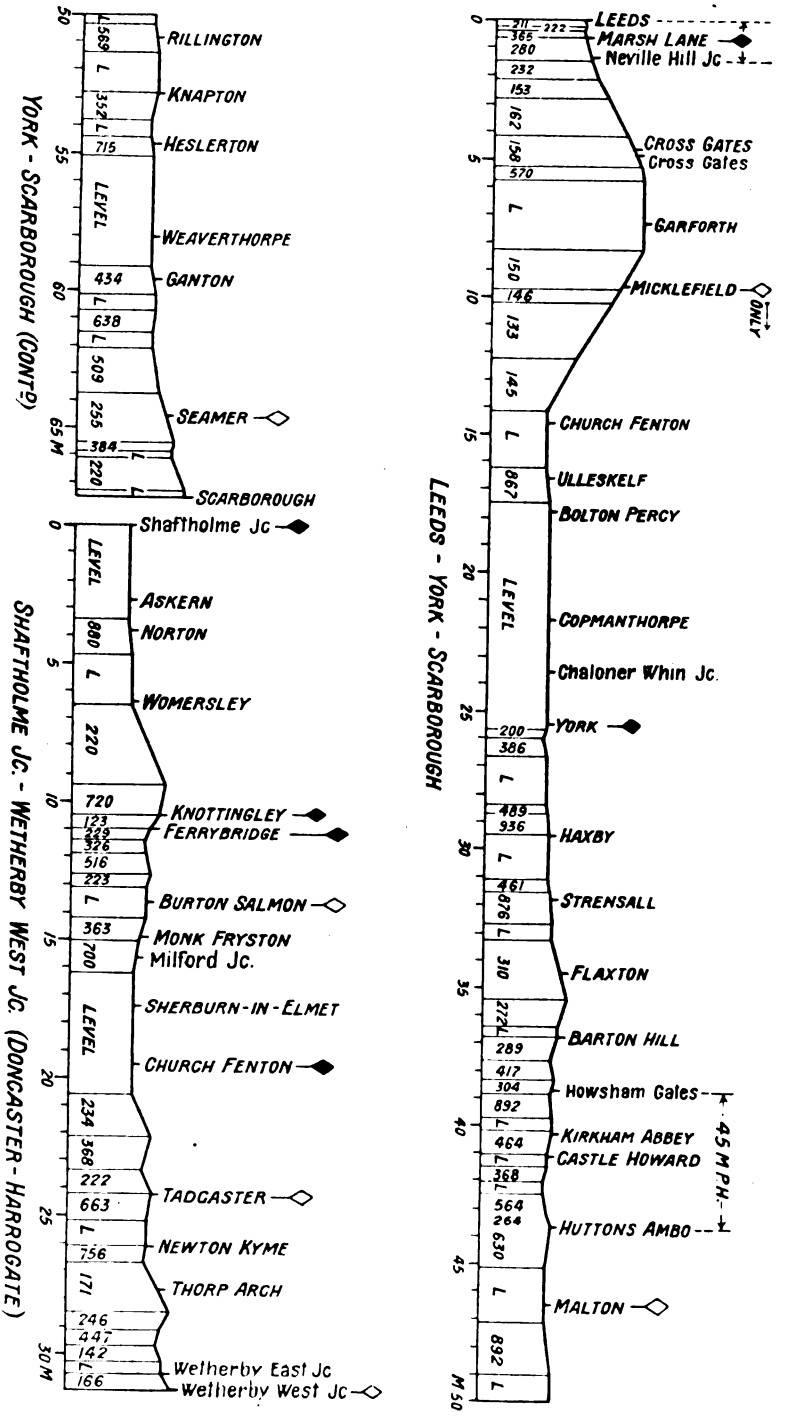


SHEET 8.—GRADIENT PROFILES, LONDON & NORTH EASTERN RAILWAY

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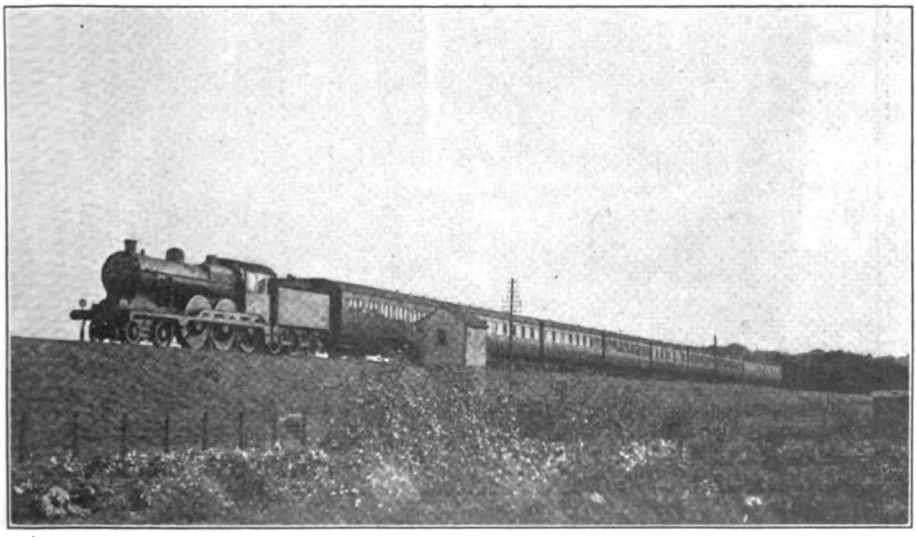
| | |
|---|---|
| Nafferton.. .. .. .. .. | 33·4 |
| Lawthorpe .. .. .. .. | 35·6 |
| Burton Agnes .. .. .. .. | 37·4 |
| Carnaby .. .. .. .. .. | 40·5 |
| BRIDLINGTON .. .. .. | 42·7 |

**Leeds to York and Scarborough (Sheet 8).**

*Mile-posts up (south) side, Micklefield to York (zero); and down (north) side, York (zero) to Scarborough.*

| | |
|---|---|
| LEEDS (NEW STATION) .. .. | 0·0 |
| Micklefield (see Leeds to Hull) .. | 9·7 |
| CHURCH FENTON .. .. .. | 14·8 |
| Ulleskelf .. .. .. .. .. | 16·7 |
| Bolton Percy .. .. .. .. | 17·9 |
| Copmanthorpe .. .. .. .. | 21·8 |
| *Chaloner Whin Junction (up)* .. .. | 23·6 |
| YORK .. .. .. .. .. | 25·5 |
| *Bootham Junction (up)* .. .. .. | 28·0 |
| Haxby .. .. .. .. .. | 29·7 |
| Strensall .. .. .. .. .. | 32·1 |
| Flaxton .. .. .. .. .. | 34·7 |
| Barton Hill .. .. .. .. | 37·0 |
| *Howsham Gates (up)* .. .. .. | 38·9 |
| Kirkham Abbey .. .. .. | 40·5 |
| Castle Howard .. .. .. .. | 41·3 |
| Huttons Ambo .. .. .. .. | 43·9 |
| MALTON .. .. .. .. | 46·7 |
| Rillington .. .. .. .. | 51·1 |
| Knapton .. .. .. .. .. | 53·1 |
| Heslerton .. .. .. .. | 55·0 |
| Weaverthorpe .. .. .. .. | 58·4 |
| Ganton .. .. .. .. .. | 60·0 |
| Seamer .. .. .. .. .. | 64·7 |
| SCARBOROUGH .. .. .. | 67·6 |

Although every effort has been made to secure accuracy, a few errata crept into the first instalment of these articles, and should be noted by those who are taking steps to preserve the series. The signal-boxes both at Helpston (81·9 miles from London) and at Tursdale Junction (59·0 miles from York) are on the down side of the line, and not the up. Piper's Wood Box (149·5 miles), though closed, is still in existence and is a useful timing point, marking the summit of that name. Mr. R. Lendrum-Ainslie has kindly pointed out that the mileages of Marshall Meadows and Abbeyhill Junction signal-boxes are respectively 67·9 and 123·5 miles from Newcastle, and not 68·6 and 123·8 miles as shown; also that Niddrie East Junction Box, shown on the profile, is now closed and dismantled, and has been replaced by Monktonhall Junction Box, on the down side, 118·3 miles from Newcastle. In answer to this correspondent, it may be stated that mileages at junctions and sidings are given to the signal-box in each case, and not to the junction points.



*Photo*] [*H. Gordon Tidey.*

**LIVERPOOL STREET—CROMER RESTAURANT CAR EXPRESS, L.N.E.R.**

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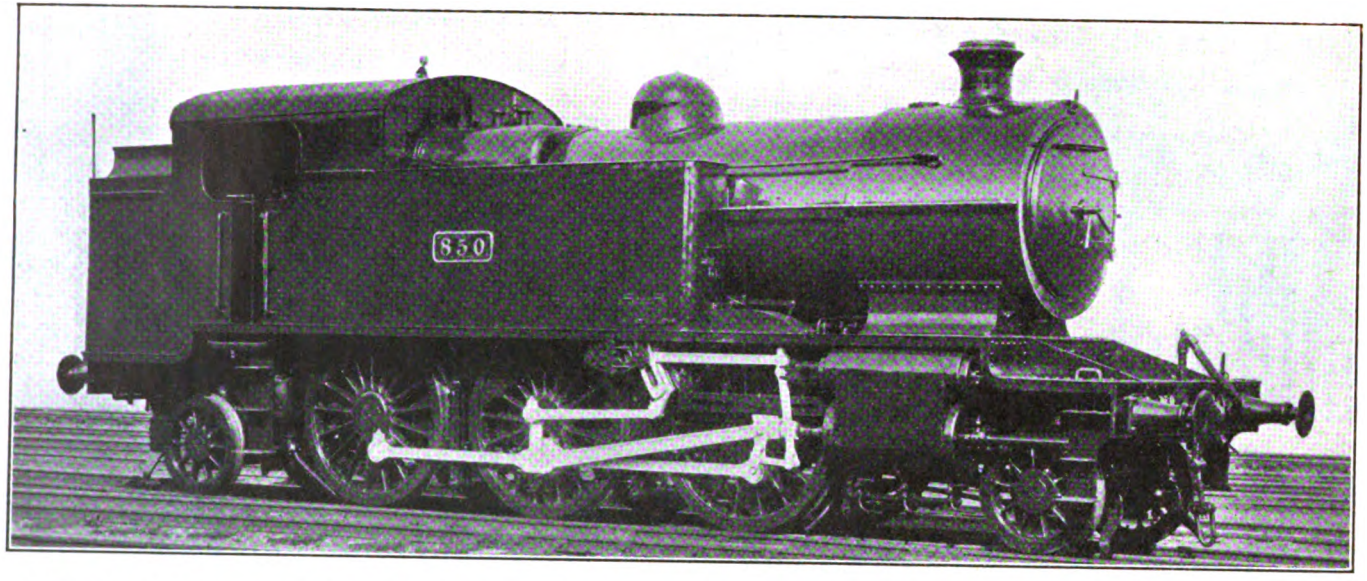


# NEW 2-6-2 TANK ENGINE, GREAT SOUTHERN RAILWAYS, IRELAND.

**Designed by Mr. J. R. Bazin, Chief Mechanical Engineer.**

THESE engines, built at Inchicore, are intended for service on the Cork, Bandon and South Coast, Dublin and South Eastern, and other sections of the system which have short-distance passenger traffic.

The main particulars are :—Cylinders, diameter, 17½ by 28 in. Wheels, coupled, diameter, 5 ft. 6 in. Boiler working pressure, 160 lb. per sq. in. Heating surface : tubes, 697 sq. ft. ; firebox, 119 sq. ft. ; superheater, 240 sq. ft. ; total, 1,056 sq. ft. Grate area, 19·75 sq. ft. Weight in working order, 71 tons 10 cwt.

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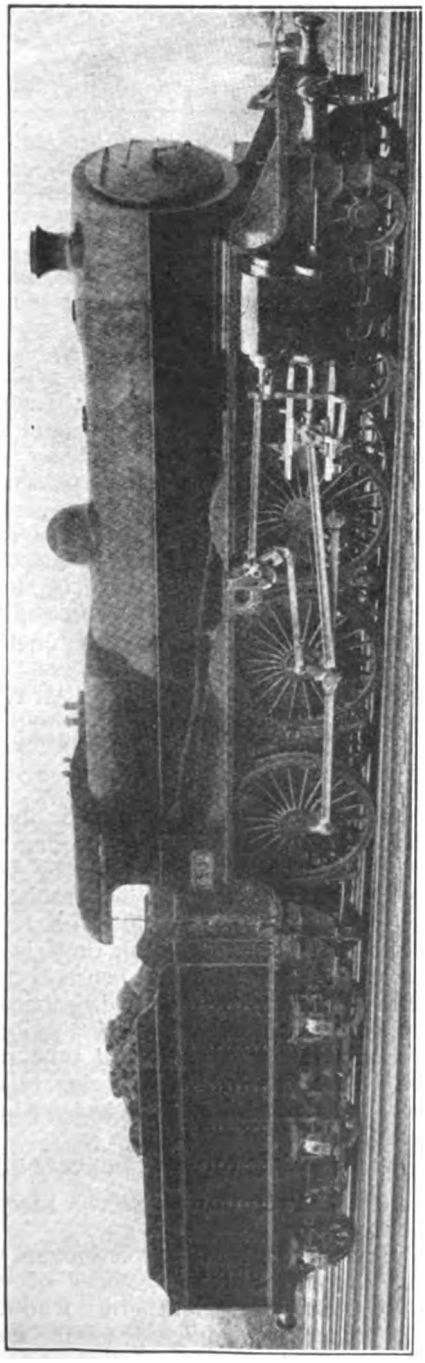
# Rebuilt 4-6-0 Locomotive, Great Southern Railways, Ireland.



By courtesy of Mr. J. R. Bazin, Chief Mechanical Engineer, Great Southern Railways, Ireland, we are enabled to illustrate and describe the reconstruction of locomotive No. 402 of the Great Southern Railways of Ireland, a 4-6-0 type express passenger engine originally built with four cylinders and recently converted by Mr. Bazin to two cylinders. The engine was constructed in 1921 as a four-cylinder single-expansion type, having the dimensions given below. The conversion took place in 1927, the purpose being to see whether any economy in working could be effected, and the result after twelve months' constant service on the main line of the Great Southern Railways between Dublin and Cork has, Mr. Bazin informs us, fully justified the alteration.

The engine has not only shown a remarkable reduction in coal and water consumption, but shed repairs have also been reduced to a minimum. An interesting point is that the boiler is of the same dimensions as in the case of the 4-cylinder locomotives and is interchangeable with the "500" class, the cylinders and motion being also interchangeable with that class. A larger type of tender has been fitted, having a water capacity of 4,500 gallons and coal capacity of 8 tons.

The main particulars before and after conversion are as follow :—

| | Four cylinders. | Two cylinders. |
|---|---|---|
| Cylinders, dia. .. | .. 14 in. | 19½ in. |
| ,, piston stroke | 26 in. | 28 in. |
| Piston valves, dia. | .. 8 in. | 10 in. |
| Wheels, bogie, dia. | .. 3 ft. 0 in. | 3 ft. 0 in. |
| ,, coupled, dia. | .. 6 ft. 7 in. | 6 ft. 7 in. |
| Boiler pressure .. | .. 175 lb. per sq. in. | 180 lb. per sq. in. |
| Heating surface— | | |
| Tubes .. .. | .. 1,590 sq. ft. | 1,590 sq.ft. |
| Superheater .. | .. 350 sq. ft. | 350 sq.ft. |
| Combined total | .. 2,098 sq.ft. | 2,098 sq.ft. |
| Grate area .. | .. 28 sq.ft. | 28 sq.ft. |
| Weight of engine and tender in working order | .. 112 tons 8 cwt. | 121 tons 10 cwt. |



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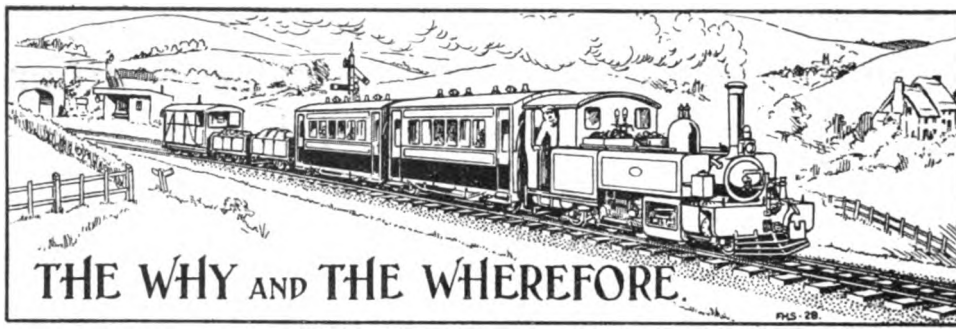


RAILWAY MAGAZINE *readers desiring information should mark envelopes "Query" in the upper left-hand corner, and address them to the Editor. Questions relating to the dimensions and weights of railway rolling-stock and to names, numbers, dates, &c., of locomotives should not be forwarded. No reader should send more than two questions in one month. Correspondents are requested to write on one side of the paper only, and although they must give their names and addresses, pen-names or initials may be inserted for Editorial use. Before asking for information concerning railway history or "grouping," the pages of the "Railway Year Book" (5s. net) should be consulted. The thirty-first Annual Edition (1928) of this standard railway reference work is now published. All previous Editions are out of print.*

**2-6-4 Tank Locomotive, Metropolitan Railway.**

The locomotive shown hauling the goods train near Amersham on the Metropolitan Railway in the photograph appearing on page 445 of the December, 1928, issue is one of a number which were supplied completely finished and ready for service to the Metropolitan Railway in 1925 by the Geo. Cohen Armstrong Corporation, their construction having been carried out by Sir W. G. Armstrong, Whitworth & Co. Ltd., Newcastle. Certain parts of the engines were supplied by Woolwich Arsenal out of the stock of locomotive components manufactured there in 1920 to the designs of Mr. R. E. L. Maunsell, Chief Mechanical Engineer of the Southern Railway; whilst other parts were manufactured by Armstrong, Whitworth & Co. Ltd. to the designs of Mr. G. Hally, Chief Mechanical Engineer of the Metropolitan Railway. Mr. Maunsell's designs were the same as those which he adopted for his Southern Railway 2-6-0 tender and 2-6-4 tank engines, and this accounts for the similarity upon which you remark. The spacing of the coupled wheels of these engines is the same as the 2-6-0 tender engines on the Southern Railway, though the "River" class tank engines had the coupled wheels placed more closely together.

[Reply to W. P. STANWAY.]

**Grafton Curve, G.W.R.**

Mr. C. R. Clinker writes:—"This piece of line was opened on September 6, 1905, at a time when it was thought that Tidworth was to be made a large military depot on the same scale as Aldershot. This did not, however, mature, and the curve was therefore not used for the intended traffic. No regular passenger service has ever been worked over it, troop trains and excursions only being run. The last two excursions to use this line were a half-day from Tidworth to Paddington on November 24, and a similar trip from Paddington to Andover Junction on November 25."

[Further reply to J. A. T.]

**Metropolitan and District Railway Electrification.**

The various sections of these two railways were mostly electrified during 1904 and 1905, these dates covering the sections particularly mentioned by you. The Metropolitan District lines radiating from Acton Town (then Mill Hill Park) were to some extent used for the original experimental installations; hence, certain of these sections were operated electrically before the main routes. No information is yet available as to additional tube railways. Several schemes are being talked about, but no definite action has yet been taken.

[Reply to W. A. SHEPHERD.]

**Southern Railway Central Section Electric Stock.**

The electric motor cars operating on the Coulsdon and Sutton services of the Central Section, Southern Railway, operate on a line voltage of 6,600. Each car is mounted on two bogies, there being



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two 200 B.H.P. motors on each bogie. They are designed for a standard speed not exceeding 35 m.p.h., and, although higher speeds can be run for short periods, the maximum speed at which these trains work is probably within the region of 45-50 m.p.h. for short distances only.

[Reply to G. M. BARRETT.]

**Injector Steam Pipes on "Lord Nelson" Locomotives, Southern Railway.**

Two injectors are fitted under the footplate on the "Lord Nelson" class 4-6-0 locomotives of the Southern Railway. The one fitted on the left is a Gresham No. 11 live steam injector, while the other, on the right-hand side, is a Davies & Metcalfe No. 11 exhaust steam injector of type F. The live steam pipes to these injectors are taken from the base of the whistle mounting on top of the firebox immediately in front of the cab.

[Reply to "SIR FRANCIS DRAKE."]

**G.W.R. Rolling Stock on Southern Services.**

The set of Great Western Railway coaches which you and other correspondents have noted in regular service during the summer months on Southern Railway trains, notably the 8.50 a.m. Victoria to Portsmouth and 4.30 p.m. Portsmouth to Victoria, is an example of the use of foreign stock which railway companies frequently make to balance services provided by their own stock on another company's line.

[Reply to W. P. STANWAY and Others.]

**The "Cheapest" Excursion.**

Your query is one that can only be answered when it is decided what is meant by cheapest. Do you refer to the smallest total amount or to the best value for the amount charged in regard to the number of miles concerned. On the former basis, the day excursion rate now charged between Walton-on-the-Naze and Frinton-on-Sea, L.N.E.R., for which, we understand, the charge is 1d., is probably the cheapest on record.

[Reply to "CITY OF TRURO."]

**Disappearing Locomotives.**

Your correction that L.S.W.R. outside-cylinder 4-4-2 tank engines should have been added to Mr. Brewer's list is noted. A very few only of these engines now remain in service, mostly on country branch lines. All the "720" class of 4-2-2-0 engines have been broken up. We agree that the mention of Clapham Junction would recall many interesting reminiscences.

[Reply to P. WEIL.]

**Ivatt and Marsh "Atlantic" Engines.**

Tractive effort of the superheated Ivatt "Atlantics" on the L.N.E.R. at 85 per cent. working pressure is 17,340 lb., of the earlier series of L.B. & S.C. "Atlantics," non-superheated, 18,910 lb., and of the superheated Brighton "Atlantics," 20,710 lb. The two latter types gain in their tractive effort figure chiefly by the provision of larger cylinders than in the Ivatt engines.

[Reply to A. J. SHAUGHNESSY.]

**Cut-Off.**

Cut-off is the point in the forward or backward movement of the piston in the cylinder, expressed as a percentage of the piston stroke, at which the piston-valve or slide-valve cuts off the supply of steam through the steam port. This percentage can be varied by the driver by means of the wheel and screw or lever in the cab controlling the valve motion.

[Reply to "LIVERPOOL STREET."]

**Pre-War Midland Sleeping Car Services.**

Before the war, sleeping cars were run from St. Pancras, during the summer season, at 7.10 p.m. to Aberdeen, Inverness and Fort William; at 8.15 p.m. to Stranraer Harbour; at 9.30 p.m. to Edinburgh and Glasgow; and at 12 midnight to Glasgow. With the corresponding return workings this made 14 services daily.

[Reply to G. A. PEARSON.]

**"1400" Class Locomotives, L.N.W.R.**

These engines were four-cylinder compounds and designed for mixed-traffic duties. None of them, so far as we can recollect, was rebuilt in any form. They were not, apparently, ever regarded as particularly satisfactory, and although some of them remained in service for a considerable period, they have all been scrapped for a number of years past.

[Reply to C. J. V. HUGHES.]

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**Broad Street Station.**

This station was brought into use in 1868, when the Dalston Junction-Broad Street extension was completed. Prior to that, North London trains ran between Chalk Farm and Bow *via* the Mildmay Park-Hackney connecting line, proceeding from Bow to Fenchurch Street, some also running to Poplar and Blackwall.¶

[Reply to L. H. C.]

**Lamps on Guards' Vans.**

Usually two lamps are fitted to the sides of guards' vans to show two white lights forward and red behind. The tail lamp proper shows behind only and indicates the end of the train, while the white lights are an indication to the driver that the whole of his train is following.

[Reply to C. J. COGHLAN.]

**Freight Trains, L.N.E.R. (G.C. Section).**

Certain express freight trains, such as the 10.20 p.m. and 11 p.m. out of Marylebone (Goods), use the Aylesbury route, but the heavy G.C. freights mostly travel *via* Wycombe, on account of the easier gradients of the Great Western and Great Central Joint line.

[Reply to B. K. COOPER.]

**Summer Train Services.**

You are correct in drawing attention to the slight slip on page 363 of the Summer Train Services article in November last. The general average of the Southern Railway services should have been shown as 0·71 per cent. *slower* than in 1914, not faster.

[Reply to T. A. BACON.]

**L.T.S.R. 4-6-4 Tank Engines.**

These engines were ordered by the London, Tilbury and Southend Railway, but delivered after that system had been taken over by the Midland Company; hence they were delivered in Midland red with Midland numbers and never bore names.

[Reply to S. E. R.]

**Train Ferry Vehicles.**

Presumably the box wagon of "German type" noted by you at Angel Road, L.N.E.R., and a similar vehicle mentioned by Mr. G. T. Moody in the January number, were vehicles used for through Continental services *via* the Harwich-Zeebrugge train ferry.

[Reply to S. LUCAS.]

**The L.M.S.-G.W. Locomotive Exchange, 1926.**

We believe that the G.W.R. engine *Launceston Castle* passed on to L.M.S. metals *via* Acton, Acton Wells Junction, and the North and South-West Junction line to Willesden—a very simple transfer. We have no information on your other query.

[Reply to S. RANE.]

**Tunnels on Tadworth Branch, Southern Railway.**

There are two tunnels between Kingswood and Tadworth station on the branch line from Purley to Tattenham Corner on the Southern Railway, and their approximate lengths are respectively 12 chains and 2½ chains.

[Reply to "SHIRBURNIAN."]

**Siding near Croydon, Wimbledon and Croydon Line, S.R.**

From the particulars you give of the line branching off the Wimbledon and Croydon line of the Southern Railway near Croydon Gas works, we presume you are referring to a length of track used as a siding.

[Reply to P. S. EVETTS.]

**G.W.R. Locomotive "Windsor Castle."**

The plate noted on this engine bears an inscription to the effect that it was driven by H.M. The King on the occasion of a visit to the Swindon works. The lettering was given in detail at the time.

[Reply to J. L. MAWHOOD.]

**Corridor Tenders, L.N.E.R.**

These are not necessarily allocated to any particular engines, as shown by the fact that they do not bear engine numbers. They are used for whatever engines may be allocated to duties calling for corridor tenders.

[Reply to J. L. MAWHOOD.]

**Edenderry Branch, G.S.R. (I.).**

No information is available as to when this branch, from Enfield, late the G.W.R., Ireland, was opened.

[Reply to C. J. COGHLAN.]

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# New Year Official Changes.

*Most of the Appointments and Changes covered below have been mentioned, but we now give Photographs and Biographical particulars.*

MR. S. H. HUNT, C.B.E., who retired at the end of last year from the position of Vice-President (Railway Traffic Operating and Commercial Section) of the London Midland & Scottish Railway, had, prior to becoming one of the four Vice-Presidents as from January 1, 1927, occupied the position of Chief Goods Manager since the formation of the L.M.S.R. He had previously held a corresponding position on the late London & North Western Railway, having been appointed thereto as from January 1, 1919. Mr. Hunt entered the service at Liverpool (Waterloo) goods station in 1880. In 1896 he was appointed Goods Agent at Canada Dock, and shortly afterwards became Chief Clerk to the District Goods Manager at Liverpool. Two years later he filled the position of Assistant District Traffic Superintendent at Lancaster. In February, 1902, Mr. Hunt was brought to London as Assistant Goods Superintendent at Broad Street, but in the following year he went to Garston Docks as Traffic Superintendent. When, in 1910, the company established a new Commercial Department, Mr. Hunt was again transferred to London as Chief of the Buying and Sales Department, receiving the title of Assistant to General Manager. Soon after the outbreak of the war, Mr. Hunt accompanied the late Sir Guy Calthrop to France on an inquiry in connection with the Red Cross Society, and later he was selected to go with Sir Francis Dent, General Manager, South Eastern and Chatham Railway, to Egypt and Salonica on another important mission. When the late Sir Guy Calthrop was invited by the Government to undertake the difficult task of Coal Controller, Mr. Hunt and Sir Richard Redmayne were called upon to act as his Chief Assistants. Mr. Hunt was Chairman of the Goods Managers' Conference of the Railway Clearing House for the year 1925.

* * *

MR. F. G. EVANS, C.B.E., who has been appointed a Vice-President (Railway Traffic Operating and Commercial Section) of the London Midland & Scottish Railway, consequent upon the retirement of Mr. S. H. Hunt, C.B.E., has held the position of Secretary to the company since November, 1927. He commenced his business career in the printing works of McCorquodale & Co. Ltd., whence he went to the London, Edinburgh & Glasgow Assurance Company. He entered the service of the London & North Western Railway Company in the Audit Office on December 13, 1886, and became the Audit Accountant of that company on January 1, 1915. Mr. Evans was appointed Audit Accountant of the new London & North Western Railway on January 1, 1922, and of the London Midland & Scottish Railway upon the amalgamation under the Railways Act on January 1, 1923. He was made Chief Stores Superintendent on January 1, 1925, becoming Secretary in November, 1927, as above mentioned. Mr. Evans served as a member of the War Office Railway Financial Commission in France, in connection with which he received the Commandership of the Order of the British Empire in 1920. He also served upon the Accountants' Executive Committee in the working of the agreement with the Government for the control of the railways during the Great War, and has been Chairman of the Railway Clearing House Accountants' Standing Committee.

* * *

MR. O. GLYNNE ROBERTS has been appointed Secretary of the London Midland and Scottish Railway Company. The Secretary's Department has been amalgamated with the Central Executive Office, and Mr. Roberts retains his former position as Secretary of the Executive Committee and Assistant to the President. He has held the office of Assistant to the President and Superintendent of the Central Office from January 1, 1927. Prior to that he had held the position of Assistant to the General Manager, to which he was appointed in January, 1923. He had held a similar position as Indoor Assistant to the General Manager of the late London and North Western Railway from the beginning of 1922. Mr. Glynne Roberts entered the L.N.W.R. service at Holyhead in 1896. Two years later he was transferred to the District Traffic Superintendent's Office at Chester, and in January, 1900, he was appointed Staff and Confidential Clerk to Mr. H. G. Burgess, the then Irish Traffic Manager. In 1902 he was appointed Outdoor Clerk in the Outdoor Goods Manager's Office at Manchester, being made an Out-



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**MR. S. H. HUNT, C.B.E.,**

Who retired on December 31 from the position of Vice-President (Railway Traffic Operating and Commercial Section) of the London Midland & Scottish Railway.

[*Langfier.*

**MR. F. G. EVANS, C.B.E.,**

Who has been appointed Vice-President (Railway Traffic Operating and Commercial Section) of the London Midland & Scottish Railway as from January 1, 1929.

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*Elliott*] MR. O. GLYNNE ROBERTS, [*& Fry.*

Who has been appointed Secretary of the London Midland & Scottish Railway Company, in addition to his former position as Secretary of the Executive Committee and Assistant to the President.

*Elliott*] MR. I. B. PRITCHARD, [*& Fry.*

Appointed Chief Legal Adviser, London & North Eastern Railway.

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**MR. H. S. STEWART,**
Secretary and Assistant to General Manager, Metropolitan Railway, 1925-28.

*Elliott*] [*& Fry.*

**MR. H. S. CHAPMAN,**
Appointed Secretary, Metropolitan Railway, as from January 1, 1929.

*Elliott*] [*& Fry.*

**MR. J. S. ANDERSON.**
Appointed Solicitor, Metropolitan Railway, as from January 1, 1929.

*Lafayette*] [*Dublin.*

**MR. R. D. ROBERTS,**
Appointed Irish Traffic Manager, L.M.S.R.

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door Assistant to Mr. F. T. Kinsman in 1908. Mr. Glynne Roberts went to Euston in 1911, and after serving three years on the Chief Outdoor Goods Manager's Staff, was appointed Chief Staff Clerk to the Chief Goods Manager. In October, 1917, he was appointed Assistant Head of Staff Department in the General Manager's Office, being re-transferred to the Chief Goods Manager's Office as Chief Clerk in February, 1918. He was appointed Chief Clerk to the General Manager in August, 1920.

* * *

M. Ion Buchanan Pritchard, who, as already announced in these pages, has been appointed to succeed Sir Francis Dunnell as Chief Legal Adviser to the London & North Eastern Railway, is the son of the late Prof. Urban Pritchard, formerly Aural Surgeon at King's College Hospital, and Professor of Aural Surgery at King's College. He was educated at Clifton and Trinity College, Cambridge, where he took his M.A. degree. He was awarded the John Mackrell Prize at the final solicitors' examination, and later was articled with Sharpe, Pritchard & Co., solicitors and parliamentary agents. He was admitted a solicitor in October, 1906. In 1913, he became Assistant Solicitor to the Metropolitan Railway, and succeeded to the post of Chief Solicitor in 1918, which office he relinquished at the end of last year in order to take up the duties of his new appointment.

* * *

Mr. Herbert S. Stewart, who retired at the end of the year from the position of Secretary and Assistant to the General Manager, Metropolitan Railway, had held these offices since the beginning of 1925, when he succeeded Mr. W. H. Brown as Secretary. He was born in July, 1868, educated at Bishop's Stortford College and at London University College School, and received a technical education at King's College, London, and the London School of Economics. He entered the service of the Metropolitan Railway in the Audit Office in October, 1885, afterwards obtaining experience in the Accountant's Department and in the General Manager's Office. In October, 1903, he was appointed Chief Clerk in the Accountant's Department, and in January, 1911, became Chief Clerk to the General Manager. He was appointed Assistant to the General Manager in October, 1913. Mr. Stewart for some time held the office of Secretary to the East London Joint Committee.

* * *

Mr. H. S. Chapman, who has been appointed to succeed Mr. H. S. Stewart as Secretary to the Metropolitan Railway Company, was born at Catford in May, 1890, and educated locally. He entered the service of the Metropolitan Railway in 1904, being appointed to the Registration Department, and was made Transfer Clerk in October, 1922. Four years later he was appointed Chief Clerk to the Secretary. During the war, Mr. Chapman served in a Light Railway Operating Company of the Royal Engineers.

* * *

Mr. John Sloane Anderson, who has been appointed Solicitor to the Metropolitan Railway Company, was born in 1888 and educated at Radley. He was articled to Mr. C. St. John Roche and became an Assistant Solicitor to the Railway Company early in 1914. Mr. Anderson enlisted at the outbreak of the war in the U.P.S. Battalion of the Royal Fusiliers, and was commissioned into the Queen's (Royal West Surrey) Regiment, and later transferred to the Royal Flying Corps.

* * *

Mr. R. D. Roberts, who has been appointed Irish Traffic Manager for the London Midland & Scottish Railway at Dublin, entered the service of the former London & North Western Railway Company as an apprentice clerk at Holyhead in December, 1899, completing his training on the Dundalk, Newry and Greenore Railway. After filling various positions in the Liverpool and Leeds districts, he was appointed Goods Agent at Stafford in July, 1913, and subsequently Goods Agent at Shrewsbury in February, 1915. In March, 1916, he was loaned by the London & North Western Railway Company for special duties at the Ministry of Munitions, London, and on his return to the railway service in September, 1916, he was appointed Outdoor Assistant to the Outdoor Goods Manager at Euston. Following upon the amalgamation of railways, Mr. Roberts was transferred in 1922 to the office of the General Superintendent Western Division, Manchester. In March, 1924, he was appointed Chief Clerk to the Goods Operating Manager at Euston, and in September, 1925, was made Assistant Irish Traffic Manager, which position he has continued to fill until his present appointment. Mr. Roberts was recently appointed a member of the Railways Committee on National Development in the Irish Free State, which body is engaged in exploring the possibilities of developing and expanding all classes of Irish agriculture intended for export.



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MR. W. H. C. CLAY, who has been appointed Land and Estate Agent, L.M.S.R., in succession to Mr. F. J. Stannard, retired, became Assistant Land and Estate Agent as from November 1, 1924, having previously held the position of Divisional Land and Estate Agent (Midland Division), to which he was appointed early in 1923. He was born in 1879, and obtained a Queen's Scholarship at Westminster School. After leaving Westminster in 1897, he took a three years' course in civil engineering at the Central Technical College, and obtained a diploma in civil engineering in 1900. He then became a pupil to the late Mr. J. A. McDonald, Chief Engineer of the Midland Railway, and became an Assistant in the Engineer's Department in 1902. In 1903, Mr. Clay was transferred to the Estate office. He was appointed Chief Assistant in 1906, and Assistant Estate Agent in 1910. In August, 1913, Mr. Clay was appointed Estate Agent of the Midland Railway Company. On the outbreak of war, Mr. Clay rejoined his unit and proceeded on active service early in 1915, being subsequently invalided home and ordered to the War Office in charge of the Quartering side of the Lands Directorate. He was three times "mentioned" for valuable services, and was awarded the Territorial Decoration, and the Order of the British Empire (Military Division). Mr. Clay is a Fellow of the Surveyors' Institution, an Associate Member of the Institution of Civil Engineers, and a Fellow of the Land Agents' Society.

* * *

MR. J. R. WORRALL, who has been appointed Divisional Land and Estate Agent (Scotland), Glasgow, London Midland & Scottish Railway, entered L.N.W.R. service in the District Estate Office at Lime Street, Liverpool, in May, 1893. He was transferred to the District Estate Office at Preston in February, 1903, and remained there until appointed District Estate Agent at Rugby. In August, 1911, he was appointed to a similar position in Birmingham. From 1915 to 1919 he served with H.M. Forces in the Gloucester Regiment. After the war he was, in April, 1919, transferred to the headquarters of the Estate Department in London, and in July, 1922, was appointed District Land and Estate Agent in charge of the London District. In June, 1923, he was appointed Divisional Land and Estate Agent for the Southern Division, having charge of the London, Rugby and Cheltenham Districts. In December, 1924, he was again appointed District Land and Estate Agent for the London District, upon the abolition of Divisional Officers. Mr. Worrall is a Fellow of the Surveyors' Institution.

*Elliott*] [*& Fry,*

**MR. W. H. C. CLAY,**
Appointed Land and Estate Agent, L.M.S.R.

**MR. J. R. WORRALL,**
Appointed Divisional Land and Estate Agent, (Scotland), Glasgow, L.M.S.R.

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**Military Transport during the Great War.**

In a recent lecture read before the Graduate and Student Society of the Institute of Transport, Mr. A. J. Dowdeswell gave some interesting information concerning military transport during the Great War, based upon personal knowledge.

The " Military Forwarding Service " was a section of the Royal Engineers which was little known to the Armies in the Forward Areas, but whose activities played a great part in ameliorating the conditions of life for almost every member of the British Expeditionary Force in France. The author explained from first-hand knowledge the initiation, development and main functions of this Section, and gave details of some of the extraordinary difficulties which were met and overcome in the course of the day's work.

In September, 1914, a transport officer and four other ranks were detailed to organise a service to forward " comforts " and parcels to the troops in the Line. The first base of operations was Havre and thousands of packages were shortly concentrated for delivery to all sections of the Expeditionary Force. The scope of the section widened and, besides " comforts," included such miscellaneous items as newspapers, officers' kits, Expeditionary Force canteen traffic, Y.M.C.A. traffic, R.A.F. traffic, medical stores, &c.

The author described in detail the administration and organisation of the unit, and referred to the respective duties of the staff, locations, enquiry, rates, statistical and claims sections.

Further bases were opened ultimately at Boulogne and Calais, which, together with selected transhipment depots at railway centres nearer the line, formed a network which covered the operations of the whole Force.

Traffic was waybilled to railhead destination and handed over after checking to the representatives of the unit concerned. In order to carry out this duty the " location " of every unit or service was recorded in a card index, as and when alterations were made, the need for secrecy as regards this information being rigidly enforced.

The section also undertook the duty of clearing through the French and Belgian Customs all consignments arriving by commercial boats, and frequently the " Octroi " or town duties also had to be negotiated.

Many loads were despatched in " transhipment " wagons, which were re-forwarded at the depots on receipt of particulars from the Base as to the number, description and destination of the contents of the wagon. The number of packages handled by this section grew from 48,000 in 1914 to over 3½ million in 1918, while the personnel increased to 18 officers and 489 other ranks at the conclusion of hostilities.

**" Railway Newsletter."**

This is the title adopted for a Bulletin which is being issued through the British Railways Press Bureau (the new title of the Railways Information Bureau) and described as " A Monthly Railway News Service " giving " Authentic Information on all Railway Matters together with Facts and Figures in Handy Form." Briefly, it is part of a scheme associated with the widening of the activities of the old Advertising (Publicity) Committee of the Railway Clearing House. That Committee, reconstituted as an Advertising and Public Relations Committee, now includes Mr. A. W. Arthurton, in charge of the (renamed) British Railways Press Bureau and further representatives of the railway companies, the actual production being in charge of a sub-committee of which Mr. Arthurton is Chairman, with other members representing the press departments of the four big railways and the Metropolitan Company. Most of the preliminary work has been done by the Advertising and Public Relations Committee, under the chairmanship (during 1928) of Mr. J. B. Elliot, Public Relations and Advertising Assistant to the General Manager, Southern Railway, and is being continued under the chairmanship



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(for 1929) of Mr. C. G. G. Dandridge, Advertising Manager, L.N.E.R., though the detail work has been done by an editorial sub-committee, consisting of Mr. A. W. Arthurton (Chairman), Mr. F. Yare (L.M.S.R.), Mr. J. R. Hind (L.N.E.R.), Mr. W. G. Chapman (G.W.R.), Mr. J. W. Davenport (S.R.), and Mr. J. Garland (Met.).

Obviously, it would easily have been possible to produce a voluminous publication, in that railways constitute a prolific field for material of real public interest. Advisedly, however, great restraint has been exercised in limiting the material to two foolscap pages, and considerable judgment used in allocating this restricted space. Sir Ralph Wedgwood's "New Year's Message" is a splendid introduction: the review of Fare Reductions for 1929, under the heading "Cheaper Still," is a useful summary of concessions which have been announced in stages; the description of "Railhead Distribution" should attract attention to a facility which is as yet very imperfectly understood; the note on "Railways—Airways" is apposite; the "Cost of Motor Transport" emphasises the inherent fallacies of many popular ideas on the subject; the explanation of "The Block System," under the heading "How it Works," should be widely appreciated as a simple explanation of how trains are signalled; and "1928—A Year of Progress" indicates that, whatever its failures and difficulties, 1928 had a distinctly good record of progress so far as railways are concerned. Extracts from "What the General Managers are Saying" are appropriately included, while the fill-up items will, no doubt, justify themselves in a similar way on a very much wider basis.

In some respects, the "Railway Newsletter" can be considered as a first cousin to "Railroad Data," a kindred sheet which has for many years been issued by, and on behalf of, United States railways, and to which we have made reference on many occasions, and have found of distinct use on others. It has, however, its own special features, and we can heartily congratulate all concerned, firstly upon the conception of which the "Railway Newsletter" is the result, and, secondly, upon the manner in which the original scheme has been brought to fruition. It is, in fact, all to the good that the railways should thus supplement what they have been doing individually for years past by collective action in regard to matters which affect them all equally. Further, the "Railway Newsletter" will assist the newspapers, and through them the general public, to obtain a clearer understanding of railway problems and to appreciate the railway viewpoint.

**The Darlington Accident Report.**

COLONEL SIR JOHN PRINGLE'S report to the Ministry of Transport has been issued. The engine of the excursion train was No. 2164 (4-4-2), and its train consisted of 11 vehicles. The parcels train was worked by 4-6-0 No. 2369. The driver of the parcels train adhered, at the Ministry of Transport inquiry, to the evidence he gave before the Coroner. The man had two shunts to make, both of which fouled the junction with the main line at the South box. The first shunt was made on No. 1 platform line, and the calling-on arm at the East box and the home signal at the South box were put to "clear" for that movement. The next shunt was made on the Duplicate line, for which its calling-on arm was lowered, but not the home signal at the South box. The man, however, ignored the latter signal, fouled the path of the down excursion, and the collision followed. Why the driver treated the signals for the two movements differently cannot be explained nor even conjectured.

Driver Bell had had considerable experience of the line between Newcastle and York, but only as a fireman. He went so far as to say, in that respect, that although he had not signed the road-book he would have done so had he been asked. Sir John Pringle thinks, however, that something more than a mere signature in a book is necessary to establish the fact that a driver is conversant, first, with the general principles of signalling and, secondly, with the position and details of signalling inside all station yards within which he may be called upon to carry out shunting work. The other point to which the report calls attention is that the lower arms on the starting signals at the East box are actually draw-ahead signals and not calling-on arms, and their substitution by a three-aspect light signal is recommended. It is pointed out that automatic train control would have prevented the accident.

The great majority of the deaths and serious injuries occurred in the five rear compartments of the second coach, which was telescoped into the front compartment of the third vehicle. Naturally, the question of telescoping is dealt with at length, but Sir John Pringle's remarks thereon are prefaced with the observation that "It is difficult to lay down any certain preventive action to prevent telescoping." The matter has been discussed with the company's Chief Mechanical Engineer and certain conditions to be met with are laid down in the report. References are also made to certain aspects of the use of steel coaches, though no definite opinions are expressed. This is a very

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important point in view of the fact that the present report is dated November 3, and therefore subsequent to the Charfield disaster. Three points are named, all of which are problems of the first magnitude. They are: (1) How will all-steel coaches behave under very violent shock effect, in cases where the force of momentum has to be entirely absorbed by the vehicles? (2) The difficulty of rescuing passengers enclosed in such vehicles. (3) The large amount of coaching stock in good condition and fit for service which it would be impossible to scrap for a number of years.

**Railway Disabilities.**

THE disabilities, both statutory and economic, under which British railway companies are placed as compared with their road competitors were outlined recently in a statement placed by Sir Josiah Stamp, on behalf of the railway companies, before the Royal Commission on Transport. Statutory control over railways had been based on the theory and fact of railway monopoly in the past. Now the monopoly had gone, but the control remained. On the economic side, the railways were now feeling the combined effect of the restriction on undue preference and of the statutory classification, from which their competitors were free. Apart from the obligation to provide statistics, road hauliers should be placed on the same footing as were the railways in exercising their road powers. The contribution towards road maintenance made by all motor vehicles was not only insufficient in itself, but wrongly distributed, as the commercial vehicles did not pay a fair proportion of the motor taxation. By the Railways Act, 1921, the return on railway capital was limited to pre-war values, and was in effect halved. In the case of railways, about 60 per cent. of the cost did not vary with the traffic volume, whereas with the road haulier the relation between volume of traffic and cost was much closer. The railway classification was framed on the principle that the more valuable classes should make a larger contribution towards overhead costs, but the road haulier charged only on the basis of cost to himself, not on the real economic cost, and was able to take from the railways the higher classes which provided the necessary margin of revenue. It was considered that the railways should be relieved of the statutory obligation to pay passenger duty and to maintain roads over railway bridges, while the Road Fund should bear a much larger proportion of the cost of all road maintenance, and long-distance road traffic should be specially regulated.

**G.W.R. and "National."**

AN agreement has been made between the Great Western Railway Company and the National Omnibus & Transport Company for the formation of a new company, with an authorised capital of £1,000,000, which will take over and operate all passenger road services now being run by the respective parties in an agreed area in the Western counties. The new company will be known as the Western National Omnibus Co. Ltd., and the Great Western and National Companies will have equal representation on the Board. It is understood that the Board of Directors of the new company will be: Sir John Jarvis (Chairman), Lord Mildmay, Mr. J. Milne, Mr. R. H. Nicholls, Mr. R. Cope, Mr. W. J. Iden, Mr. B. Smith, and Mr. H. C. Merrett. This agreement, which has been rendered possible by the new road powers recently granted to the railway companies, will enable road and rail transport facilities in the West of England to be co-ordinated. It will also facilitate considerable extensions of services already in operation, and will enable associated road and rail services to be arranged on a substantial basis. It will be recalled that the Great Western Railway introduced most of its earlier road motor services in the area concerned, including that between Helston and The Lizard, inaugurated in August, 1903, which was the first regular road motor omnibus service to be run in Great Britain.

**The "Underground's" Latest Transport Poster.**

A NOTABLE poster headed "The Londoner's Transport Throughout the Ages" has made its appearance on the station walls of the "Underground" railways. For brightness of colouring and wealth of detail it is surely one of the best and most attractive posters ever issued. It is arranged on panoramic lines, the purpose being to show the different modes of transport from A.D. 327 to the present day. There are five such lines, or groups. Commencing with Shanks's Pony and a Roman litter, the first line ends with hackney coaches (1640) and a Sedan chair (1641). The second line opens with a representation of a Thames waterman (1680) and ends with a view of the stage and hackney coaches which were in use in 1812. The most important feature of the third line is, of course, Gurney's steam carriage (1828–30) and Hancock's steam bus (1833)—flanked on the one side by a view of the first bus, chaise and cabriolet (period 1829), and, on the other, by the first four-wheeler, knifeboard omnibus and lan-

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dau (1849–61). The fourth panoramic group represents transport more or less as we know it to-day, and includes London's first horse tramway (1861), a London General omnibus (1869), a Thames penny steamer (1890), a steam omnibus (1902), an early motor bus (1909), a taxicab (1920), a charabanc (1923), an electric tram (1925) and a motor bus (1927). The contrasted group at the bottom of the bill is perhaps the happiest feature of all, for it shows in most interesting fashion the immense advance which has been made in underground railway facilities for transporting the Londoner from place to place in the metropolitan area, the views showing the "Met.'s" first underground railway in 1863, the first tube (City & South London) in 1890, the "Tuppeny Tube" (Central London) in 1900, and the Londoner's swift, safe and comfortable transport by "Underground" as we know it to-day. The poster bears the signature R. T. Cooper.

**"Further North" Section, L.M.S.R.**

SEVERAL interesting letters have been received based upon the article published under this title in the January number. Mr. T. E. Kite points out that the engine *Dornoch*, used on the Dornoch branch, is a 0-6-0 tank engine and, according to his recollection, has lost its name. Mr. W. Rawcliffe suggests that the train which used to run direct from Aviemore and pass Inverness was the "Strathpeffer Spa" express and not the "Further North" express.

**The Railway Club.**

ON December 17, at the meeting of the Railway Club, the chair was taken by Mr. W. E. Highfield, M.I.E.E. There was a good attendance of members to hear Mr. J. Pelham-Maitland, Southern Railway, give his paper on "Some Recent Developments in Main Line Electrification in France." Dealing with the Paris-Orleans line the author showed why the part electrified had been converted and the considerations which determined the use of overhead transmission with three-phase 650 volts alternating current. It was explained how the company's hydraulic power station for four months of the year produced practically nothing, and for the remaining eight months produced in excess of requirements, and how arrangements have been made with the Paris Electrical Company to make up the deficit and to receive the surplus. The paper was well illustrated by slides showing electrical equipment including the Ganz locomotive illustrated in the January number.

On December 19 the Railway Club held its Twenty-Second Annual Dinner at the Manchester Hotel, Aldersgate Street. There was a good attendance and an enjoyable evening was spent. Mr. K. Brown, who received a hearty welcome for accepting the position of President, presided. In addition to the usual toasts the Honorary Steward proposed the health of Mr. Cecil J. Allen, the retiring President, and thanked him for his past services and regretted his inability, through pressure of business, to continue as President. Members were glad to hear that Mr. Cecil J. Allen had consented to become a Past President.

On January 7, Lord Monkswell, a Vice-President, addressed the Railway Club on "Recent French Locomotive Practice." After describing the improvement which has recently been made in permanent-way construction, Lord Monkswell described his experiences over all the chief lines in recent years. The main fact brought out was the exceptional work done on more than one line up long and by no means easily-graded banks, work which for excellence is seldom performed in any country at the present time. A discussion in which Mr. Cecil J. Allen, Mr. W. A. Willox and the President took a prominent part followed, and formed a fitting close to a most interesting evening.

**The Stephenson Locomotive Society.**

THE Stephenson Locomotive Society's Winter Programme of Meetings is now well advanced, and some very interesting lectures have been much enjoyed by the members. On November 5, 1928, Mr. W. A. Willox delivered a highly entertaining lecture on "Some Continental Railway Reminiscences." This lecture described many and varied experiences on the railways of Europe during the years which immediately followed the war, and was illustrated by a very large number of lantern slides.

On December 8, 1928, Mr. J. N. Maskelyne read a paper entitled "Some Notes on Compounding," and described, briefly, the history of compounding, as applied to locomotives; the lecturer then reviewed the present position of compounding and gave a few hints as to the probable development of this feature in years to come.

On January 3 last, Mr. J. W. Beaumont, Chief Publicity Manager, Sentinel Waggon Works Limited, read a most interesting and fascinating paper describing the application of the "Sentinel" engine to railway shunting locomotives and steam rail cars. This lecture was illustrated by a series of lantern slides showing, first of all, the arrangement and details of the "Sentinel" engine, and then its application to a large number of different sizes and types of shunt-

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ing locomotives and passenger cars. The amazing developments that have taken place in the "Sentinel" engine, as applied to railway service, during the short space of five years, were clearly described, some of the difficult problems to be overcome were frankly and fascinatingly discussed, and some figures, supplied by various owners, giving particulars of the extraordinary economies obtained in operation aroused considerable interest. This lecture was thoroughly enjoyed by all who heard it, judging from the discussion which took place afterwards.

**The Wimbledon and District Model Railway Club.**

THE fifth annual exhibition of the Wimbledon and District Model Railway Club was held on December 15 at the Welcome Hall, Wimbledon, and proved a great success. In addition to the usual competitions and show of members' models and photographs, &c., there was a railway cinema (in charge of the Amateur Cinematographers Association); "lecturettes" on railway and model subjects; locomotives, from tiny 2 mm. to 1 ft. scale up to steam passenger-hauling models constantly at work; and a good display of commercial models and parts in the trade section. The prizes in the competitions were awarded as follows:—"W. H. Shephard" Cup to Mr. J. J. Langridge; 1st Senior to Mr. W. H. Robertson and 1st Junior to Mr. H. C. Wardle. The "Gairns Essay" Prizes (given by the Editor of the RAILWAY MAGAZINE) were as follows: 1st, Mr. R. R. J. Plummer; 2nd, Mr. J. C. Davies. The prizes were presented by Mr. O. J. F. Thorpe, of the Westinghouse Brake & Saxby Signal Co. on December 17. In conjunction with Mr. A. V. Hichisson, Mr. Thorpe gave an interesting cinema lecture illustrating the activities of the Westinghouse Company.

On February 18 there will be a lecture on "Day Colour Light Signalling." The Post Office Tube Railway is to be visited on February 27, though the numbers are restricted.

**British Locomotives of the 'Seventies and 'Eighties.**

THIS was the subject of Mr. Gairns' lecture in October last, and prizes were offered for two short essays thereon adjudged to be the best. The first one was awarded to Mr. R. R. J. Plummer and the second to Mr. J. C. Davies. Mr. Plummer's essay read as follows:—

"The period mentioned was, in my opinion, the heyday of graceful locomotive design in this country. The pioneer locomotives had been left behind, mostly rather ungainly machines with large overhangs at each end, long attenuated chimneys out of all proportion, and weird and wonderful domes. We had also left behind the experimental engines like the Great Western *Hurricane*, the North Western *Cornwall* and the "Cramptons," and had arrived at a period which produced a race of locomotives renowned alike for performance and appearance.

"Stroudley was building D1 Tanks and 'Terriers,' many of which survive to the present day, proving that (to pervert an old proverb), handsome not only was but did. The famous single wheeler *Grosvenor* also belongs to this period. In 1870 appeared the first of Stirling's 8-ft. singles. How can one look upon them and doubt that they were express engines. Present-day monsters give an impression of power, but never of speed. About this time several railways were building 4-4-0 engines of

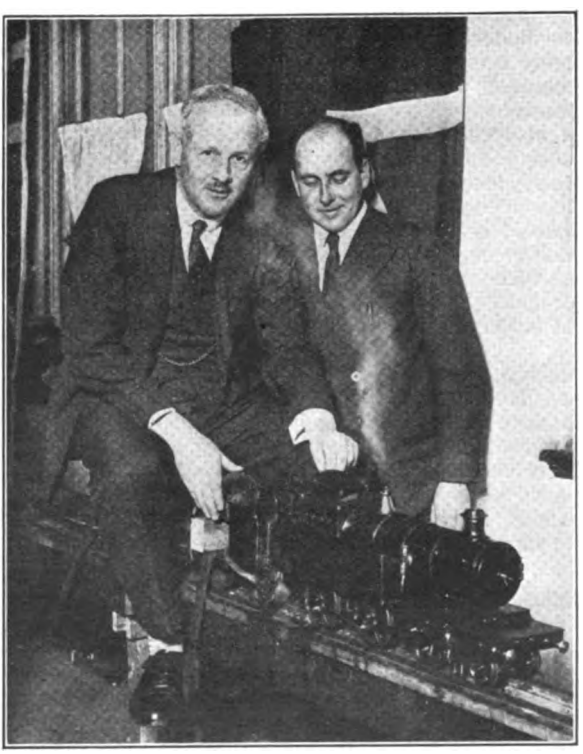

*Photo.*] [*Fox Photos.*

LORD MONKSWELL, DRIVING A MODEL TRAIN AT THE WIMBLEDON MODEL RAILWAY CLUB EXHIBITION, WITH MR. R. SHEPHERD, HON. SEC.

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particularly pleasing and racy design. One can cite Johnson's 6 ft. 6 in. 4-4-0 locomotives for the Midland in 1876, Adams' 4-4-0 for the South Western in 1880, Drummond's North British inside-cylindered 4-4-0 engines of 1876, and the first Tilbury tanks of 1880. What modern hump-backed, coned boilered, Belpaire fire-boxed locomotive can compare with these for pleasing outline? While not doubting the increased efficiency and tractive effort of the present loading-gauge squeezing race of locomotives, I cannot think they can hold our affections as those of the late 19th century have!"

MR. J. C. DAVIES writes as follows:—

"On all railways of to-day there are many of the locomotives of the 'seventies and 'eighties still running, though they are on very secondary duties, and many of them are shunters. Locomotives of dates before this time have already been scrapped, and so they would appear very much out of date on a modern railway. Locomotives of later dates than this are still running some of the lesser expresses. So the ideal time of construction of our, nowadays, 'old crocks' was the 'seventies and the 'eighties.

"These locomotives seem rather unusual to modern eyes, which makes them all the more interesting to enthusiasts. It always seems to me that an 'old crock' of a locomotive can prove much more interesting than a modern one, and those of the 'seventies and 'eighties are the ideal age. At this time, locomotives were taking on a more present-day appearance. They still differed greatly in the size and weight, but they were taking on a modern appearance, in having cast-iron chimneys instead of those built up of metal plates with obvious rivet joints, and in having roofs to cabs.

"Nowadays, we can always read about modern locomotives, but of these older ones we have to search more for details, which, in my opinion, makes their study all the more interesting, as in this search for data an affection, as well as interest, springs up for these fine old locomotives. So, on the whole, I prefer locomotives of this period to those of the present day."

**L.N.E.R. Traffic Notes.**

MR. R. A. H. WEIGHT writes:— "The up 'Queen of Scots,' loaded to eight steel Pullmans or about 325 tons in all on December 8, was delayed in the north. It left Leeds 13 min. late hauled by Ivatt 4-4-2, No. 4442; Driver W. Sparshott, Fireman H. Waddingham, King's Cross; 4 min. were lost by permanent-way cautions in the West Riding and one minute by signals in North London, but King's Cross was reached to time! The net running time throughout from Leeds to London averaged almost 60 m.p.h., whilst over the 152¾ miles from Doncaster to Harringay a time of 145 min. was recorded, which equals an average of 63 m.p.h., maintained by that marvellous twenty-year-old Atlantic with no less than 325 tons over a none too easy road. This feat does not quite equal the fastest Pullman and other runs which have been achieved over G.N. metals, for the whole distance or in part, but in view of the heavy load it ranks in brilliance equally with the finest epics which have been produced during the last few years upon the lighter West Riding, Sheffield, and Harrogate Sunday Pullmans, the 'Wool-Buyers' Flier,' &c., or, indeed, with any recorded performance.

"The main-line traffic, both before and after Christmas, was particularly heavy and interesting. Quite an amazing number of expresses to and from King's Cross weighed 500 tons and over. More than a few had round about 560 tons behind the 'Pacific's' tender, while the 10.25 p.m. down 'Aberdonian,' second part, on Friday night, December 21, with 18 corridor coaches, sleeping cars and laden bogie vans on, must have turned the scale at something well over 600 tons. Engine 2545, *Diamond Jubilee*.

"An absolute record was created for normal week-day express loading on December 22, 1928, when the popular up Yorkshire service due King's Cross at 9.25 p.m. consisted of the quintuple restaurant car set and 16 corridor bogies weighing 603 tons empty, or about 640 tons full! The engine was 2561 *Minoru*. On several occasions the down 'Flying Scotsman,' loaded to between 500 and 535 tons tare or 530 to 565 tons gross, and as the engine goes right through to Edinburgh with only a slight relief in the way of a vehicle or two detached at York or Newcastle, a locomotive working of unique severity was presented and surmounted!

"Another novel feature was the running during the week before Christmas of special trains conveying gift parcels for the mining areas under the auspices of the *Dail Mail* Fund. The first such consignment left King's Cross for Barnsley, *via* Doncaster, on Monday afternoon, December 17. The train consisted of 23 braked vans and carriage brake, and was hauled by Atlantic 4438 to Grantham, the first stop.

"Some of the Pullman expresses were made up to nine cars, representing a total load of 370 to 390 tons, and excellent running was made on several occasions with such loads on the fast Wakefield or Leeds-London non-stop runs by Atlantics."

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**Special Christmas Train Working.**

MR. E. J. NORRIS writes as follows:—"Your readers may be interested in the working of the 5.45 p.m. Clapham Junction to Penzance train, which ran on December 21, and usually runs just before the various bank holidays. The following notes were taken at Addison Road station (Kensington). According to the times advertised, 38 min. are allowed between Clapham and Kensington, an allowance which seems somewhat excessive. The following notes will explain this. About 5.50 p.m., No. 5004, 'Llanstephen Castle' arrived, tender first, from Old Oak, towing a train of about seven coaches, including a restaurant car, labelled partly for Penzance and partly for Plymouth. After running round the train, it backed into a bay platform at the Willesden end of the station. At 6.16 p.m., the portion from Clapham arrived behind 0-6-0 No. 2570, consisting of about five coaches for Plymouth and Torquay. No. 2570, which carried express headcode, uncoupled and departed hurriedly to Old Oak, so as not to delay the train. No. 5004 then drew her train out of the bay, backed on to the portion from Clapham, and departed on its way to the west at 6.25 p.m."

**A Mammoth Excursion Party.**

THE largest party ever yet taken by the Great Western Railway for the popular trip over Swindon Locomotive Works was handled in the early part of January. It consisted of boys from public and private schools in all parts of the country, belonging to the Crusaders' Union, and was arranged by our contributor, Mr. Cecil J. Allen, who is prominently connected with the organisation just mentioned. The promoters had guaranteed the usual minimum numbers for a special train, but were somewhat taken aback when they received all but 2,000 applications—representing roughly one-quarter of the total membership of the Crusaders' Union—to join the party. Actually 1,970 boys, including a certain proportion of adults, were carried, and were divided into three separate parties, on January 3, 8 and 10, respectively. Restaurant car accommodation was provided for those who had signified their intention of taking meals, and the three 50-seater cars which were run on each train served in all 723 luncheons and 1,468 teas; the service of 567 teas on the up journey on January 3, in relays of 150 each, must have created a record for so short a journey, and reflected great credit on the restaurant car staffs concerned. As regards the running, the locomotive authorities provided their most famous "King" class locomotive—No. 6000 *King George V*—for each day, and additional interest, from the boys' point of view, was lent by the mounting, on the front of the engine smokebox, of a large and striking replica of the Crusaders' Union badge. On January 3, when 720 passengers were conveyed, the 13-coach train employed weighed 476 tare tons; on the other two days a 12-coach train, weighing 436 tons, was found sufficient. Special arrangements were made by the traffic authorities to ensure a clear road, and on January 10, some notable runs were made, Swindon being reached on the down journey in 75 min. 25 sec., with a maximum speed of 74 m.p.h. at Tilehurst, while the return run of 77·3 miles to London, despite misty conditions and signal checks inwards from Acton, was completed in 74 min. 20 sec. start-to-stop, or 72¾ min. On the last-mentioned journey the engine achieved the remarkable feat of maintaining an average speed of 70 m.p.h. continuously, with a gross load of 465 tons and on a practically level track for 60 miles continuously, from Challow to Acton. The transport of these large numbers and their conduct through Swindon Works were accomplished without a hitch of any kind, the excellent arrangements made being a matter of congratulation both to the Crusaders' Union and to all the Great Western staff concerned.

**Southern Railway Programme for 1929.**

PARTICULARS have been published of the programme of new works, &c. arranged for 1929 by the Southern Railway, representing a total expenditure of over £1,750,000. The outstanding features on the rolling-stock side are that, in addition to five further engines of the "Lord Nelson" class, there are to be some new three-cylinder passenger engines for coastal services, to be known as the "Schools" class, and named accordingly. There will also be five three-cylinder goods engines, while 86 new corridor coaches, four restaurant cars, and 50 passenger luggage vans and over 1,000 goods wagons, are to be added to stock. A new station is to be built between Esher and Walton, additional platforms at Petts Wood and improvements at Tulse Hill, Bournemouth Central, Ilfracombe, Brighton, Eastbourne and Ryde (Esplanade and St. Johns), Meldon Quarry permanent-way depot, Newhaven Harbour, Southampton Docks, Eastleigh (locomotive works), Deptford Wharf, and Angerstein Wharf. There are also works associated with the Kent House and Beckenham Junction widening, the Lewisham loops, and the completion of the reconstruction of Wimbledon station. Colour light signalling is to be installed throughout from London Bridge to New Cross. The third stage of electrification is to be completed in March.

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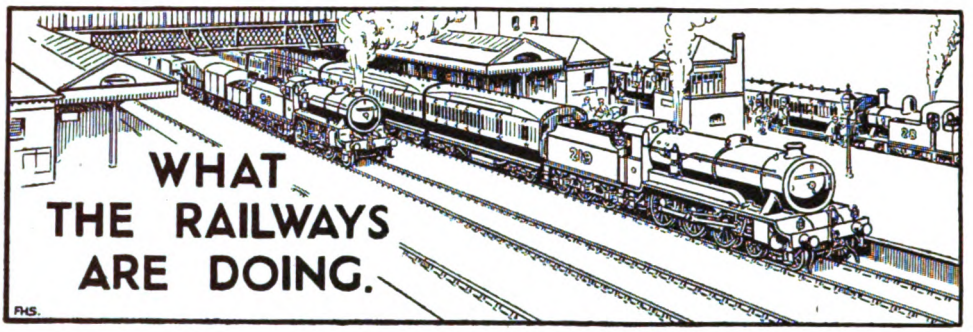

# WHAT THE RAILWAYS ARE DOING.

Lt.-Col. C. H. Bressey, C.B.E., F.S.I., who has been appointed Principal Technical Officer in the Roads Department of the Ministry of Transport, was born in 1874, spent some years abroad studying languages, and was then articled to his father, Mr. John T. Bressey, F.R.I.B.A., who practised in the City of London and also acted as adviser to various local authorities. For several years Mr. C. H. Bressey served as Surveyor and Engineer to the Wanstead Urban District Council, besides working in partnership with his father in London. In 1916, when Sir Henry Maybury went to France as Director of Roads with the rank of Brigadier-General, Mr. Bressey accompanied him as a Lieutenant in the Royal Engineers. His subsequent promotion was probably assisted by his knowledge of languages, and eventually he rose to the rank of Lieutenant-Colonel, was mentioned in despatches and awarded the O.B.E. (Military), besides being made Chevalier of the Legion d'Honneur. On the declaration of the Armistice, Colonel Bressey was made a member of the Inter-Allied Commission charged with the control of communications, and exercised duties in Cologne, Treves, &c. Among other missions he was sent to Cologne before the arrival of the Allied troops in order to report upon the administration of the Rhine Province. Upon the formation of the Ministry of Transport in 1919, Colonel Bressey was invited to join the staff of Sir Henry Maybury, Director-General of Roads, and was given the post of Divisional Road Engineer (London). In 1921, on the retirement of Mr. J. S. Killick, Colonel Bressey was advanced to the post of Chief Engineer, which he has since held. In 1924 the C.B.E. was conferred upon him. The period which has elapsed since the formation of the Ministry of Transport has been an extremely active one from the standpoint of road engineering, and Colonel Bressey has been associated directly or indirectly with most of the larger schemes which have been in progress throughout the country.

[*Photopress.*

**LT.-COL. C. H. BRESSEY, C.B.E., F.S.I.,**

Appointed Principal Technical Officer, Roads Department, Ministry of Transport.

* * *

We are officially informed that the following appointments have been approved by the Directors of the L.N.E.R. :—

Mr. R. J. M. Inglis, District Engineer, Glasgow, to be Assistant Engineer (Permanent Way), Southern Area, in succession to Mr. S. L. Murgatroyd, who retires under the age limit on January 31.

Mr. J. C. L. Train, Assistant to Chief General Manager (Works), King's Cross, to be District Engineer, Glasgow, in succession to Mr. Inglis.

Mr. H. Arnott, Assistant to Superintendent, Southern Scottish Area, to be Assistant District Superintendent, Hull, in succession to Mr. T. B. Hare.

Mr. T. Johnston, Assistant to District Operating Superintendent, Edinburgh, to be Assistant to Superintendent, Southern Scottish Area, in succession to Mr. Arnott.



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MR. EDWARD W. MELLOR and Mr. William Mewburn having notified their resignation from the Board of the Southern Railway, the directors have elected in their places Sir John E. Thornycroft (Managing Director of John I. Thornycroft & Co. Ltd.) and Sir Edward Hilton Young, M.P. (late Financial Secretary to the Treasury).

* * *

MR. P. J. FLOYD, Traffic Manager, Great Southern Railways, has been unanimously elected Chairman of the Traffic Officers' Committee of the Irish Railway Clearing House for 1929.

* * *

WE are informed that the Marquess of Aberdeen and Temair, K.T., G.C.M.G., G.C.V.O., has accepted the invitation of the Board of Management to be President of the Railway Benevolent Institution for 1929, and that Sir Herbert Walker, K.C.B., General Manager of the Southern Railway Company, has consented to be Chairman of the Board of Management for 1929.

* * *

THE Lord Chancellor has nominated Mr. Justice Mackinnon to be ex-officio Commissioner for England under the Railway and Canal Traffic Act, 1888.

* * *

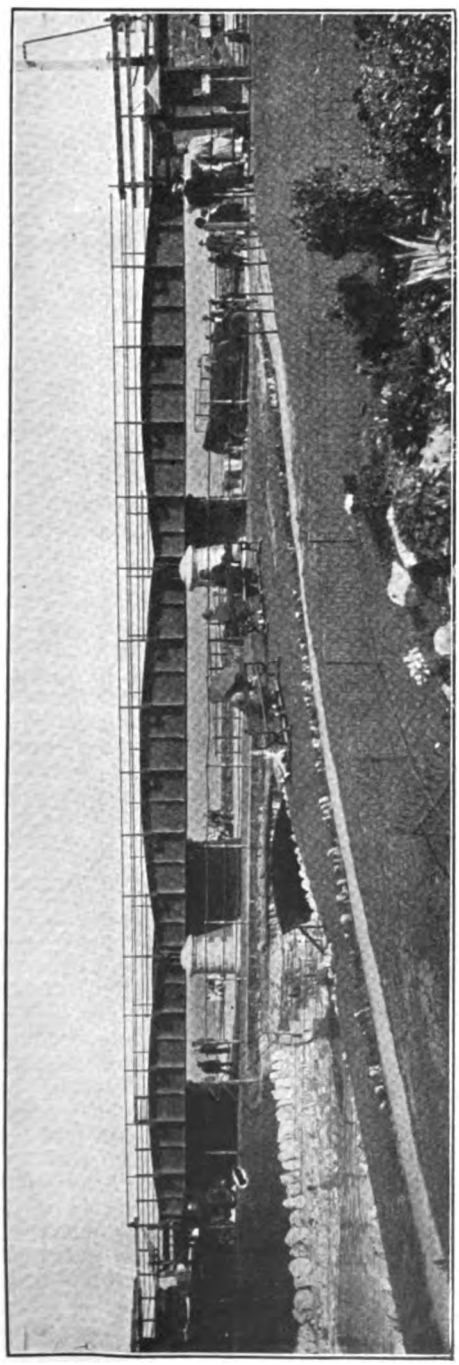
THE Council of the Institution of Railway Signal Engineers have nominated Mr. R. G. Berry, Signal Assistant, Northern Division, London Midland and Scottish Railway, as the President for 1929–30, and Mr. W. Wood, Electrical Engineer for Scotland, London and North Eastern Railway, as the Vice-President.

* * *

MR. THOMAS A. PEACE has been appointed General Manager and Chief Engineer to the Port of Bristol Authority in succession to Mr. D. Ross-Johnson who recently retired and who occupied the position of General Manager and Secretary. Mr. T. A. Peace was formerly Engineer to the Authority until the retirement of Mr. Ross-Johnson in September last, when he was appointed Acting General Manager and Secretary. Mr. Alfred J. Lloyd has been appointed Secretary to the Port of Bristol Authority, which is now a separate office.

* * *

COLONNADE Viaduct, situated immediately on the Teignmouth side of Dawlish station, G.W.R., has been entirely reconstructed. The original structure, which was built about 1846, consisted of nine spans varying from 11 ft. 2 in. to 13 ft. 6 in. When it became known locally that reconstruction in the near future would be necessary, the Dawlish Urban District Council expressed a wish that the opportunity might be embraced for improving the viaduct from the town's point of view, as the openings formed a junction



THE RECONSTRUCTED COLONNADE VIADUCT AT DAWLISH, G.W.R.

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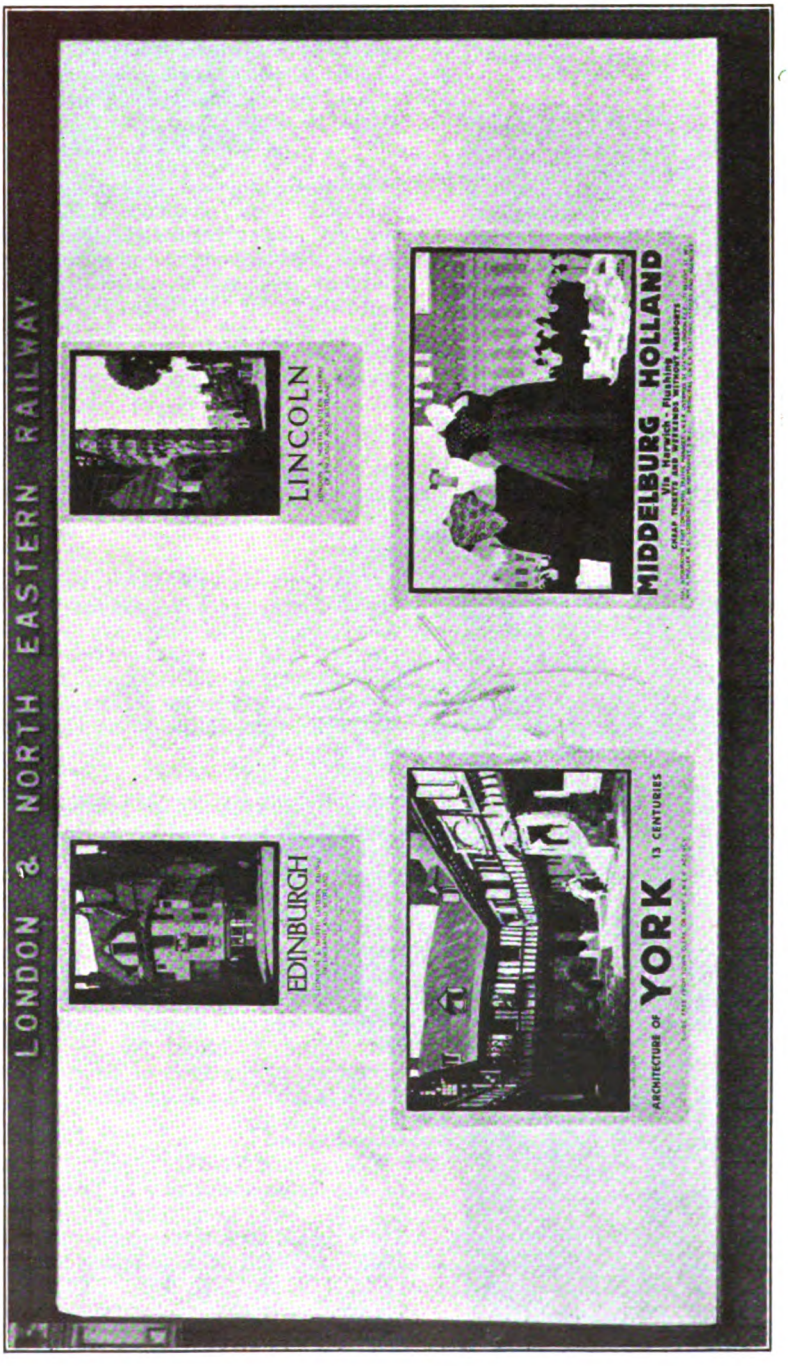


POSTER DISPLAY ON THE LONDON & NORTH EASTERN RAILWAY.

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between the town and the foreshore and promenade. Negotiations were accordingly opened, and ultimately it was agreed that the company should reconstruct the viaduct in three spans instead of nine, and this has been carried out. The superstructure is of hog-back plate main girders and pressed steel troughing. The new piers are built partly of brick and partly of granite, the whole structure being of very pleasing design.

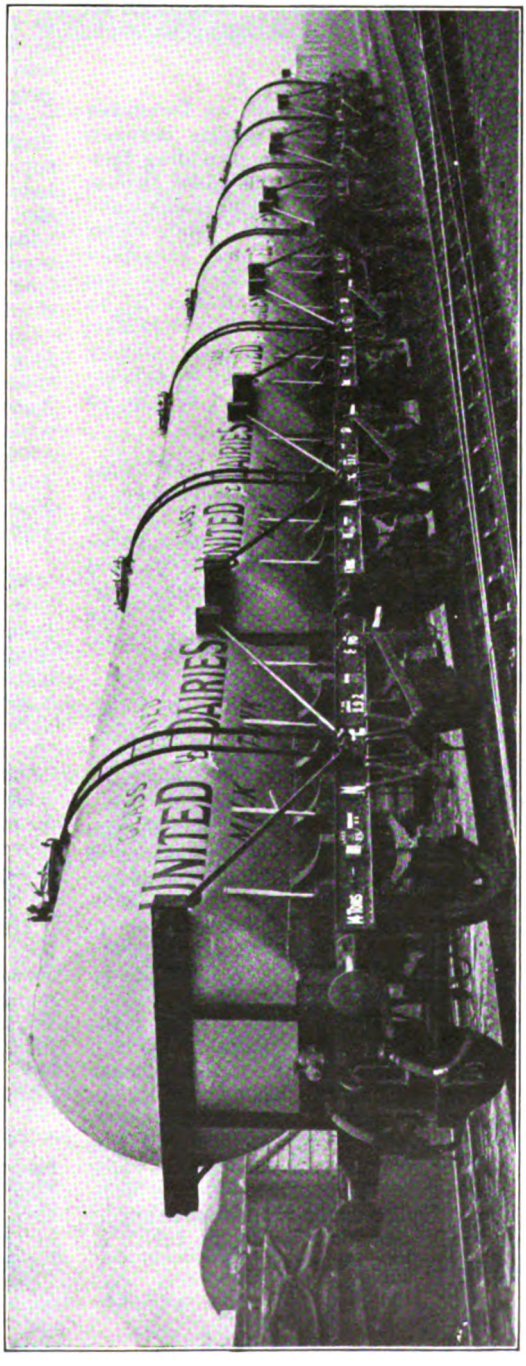
* * *

THE L.N.E.R., in co-operation with United Dairies (Wholesale), Limited, is now operating a receiving and distributing depot near East Finchley station, on the High Barnet branch, where milk is received in churns from many points on the L.N.E.R. system. It has now been decided to adopt glass-lined containers for the conveyance of milk to this depot, and to discontinue sending churns. Approximately 2,000 churns will be superseded by this change, and more than 9,000 gallons of milk per night will travel from Ingestre, Staffordshire, in special glass-lined insulated containers. To commence the service, seven wagons, each capable of holding 3,000 gallons, were put into service on Thursday, December 13. The milk supply to be dealt with by this new service is estimated to affect approximately a quarter of a million London consumers per day. The distance covered by the tanks during each night will be more than 140 miles.

* * *

THE photographic reproduction on the opposite page illustrates a new idea which the L.N.E.R. Advertising Department has just adopted of giving special exhibitions to the work of individual artists. It shows one of three boards on the drive at King's Cross station—similar displays are also appearing on selected boards at Liverpool Street and Marylebone stations, &c. The boards on which these posters are placed are draped with a grey paper background, thus distinguishing them from the general bill appearing on the company's usual blackboards. The posters shown in the present illustrations are the work of Mr. Fred Taylor R.I.

WE understand that the London Electric Railway Company contemplates applying to Parliament for powers to reconstruct Leicester Square station somewhat on the lines of the new station at Piccadilly Circus.




[*Topical.*

MILK TRANSIT IN CONTAINER WAGONS ON THE L.N.E.R.

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On Friday, December 14, Mr. J. F. Gairns, Editor of THE RAILWAY MAGAZINE, gave a lantern lecture on "The Romance of the Railway" to the Young People's Fellowship, at St. Thomas's Church, Balham.

* * *

THE top photograph as reproduced in the January number on page 14 was taken by Mr. J. J. Cunningham, and not by Mr. O. S. Nock, as stated.

* * *

THE L.M.S.R. inaugurated, on December 30, a service on Sunday nights between Heysham and Belfast, thus providing facilities hitherto lacking so far as Great Britain is concerned on Sundays. The trains leave London (Euston) at 6 p.m., Manchester (Victoria) at 9.15 p.m., and Liverpool (Exchange) at 9 p.m. on Sunday, reaching Belfast (Donegall Quay) at 6.30 a.m. on Monday. The return service leaves Belfast at 9.15 p.m. on Sunday night, reaching Liverpool and Manchester in the neighbourhood of 10 a.m. and London at 1.48 p.m. on Monday.

* * *

HALF fares on the "Underground" lines are charged for children "under 14 years of age," instead of "under 12 years of age" as hitherto. The guaranteed minimum number of tickets per annum necessary to be used by sports clubs to enable them to enjoy the cheaper travel facilities provided by the "Underground" have been reduced from 500 to 200.

* * *

THE directors of the London & North Eastern Railway have authorised the construction of 110 new locomotives. Eight of these will be of the "Flying Scotsman" Pacific type, of which 62 engines have already been constructed. The new engines will have boilers working at a pressure of 220 lb. to the square inch and a total weight of 156 tons. Other locomotives to be constructed by the L.N.E.R. consist of 12 4-6-0 express passenger engines, for service in East Anglia and elsewhere. In addition, nine locomotives of the 2-6-0 type will be built, and 27 0-6-0 medium goods engines are included in the programme. Twenty-eight tank locomotives, built to a new design for service in Scotland, and six suburban tank locomotives, are also to be constructed, and 20 0-4-0 shunting engines will be acquired for shunting work in goods yards and elsewhere. The whole of these locomotives, with the exception of the shunting engines, will be constructed in the L.N.E.R. shops during the course of 1929.

MR. J. C. LLOYD, M.Inst.C.E., Chief Engineer of the Great Western Railway, who died on January 1, was born in 1867, and articled to his father, the late Mr. E. H. Lloyd, formerly Divisional Engineer of the Great Western Railway at Neath. Mr. Lloyd was appointed to the company's staff in that town in 1888, and transferred to the Plymouth Divisional Office in 1891 for special work preparatory to the conversion of the railway from the broad to narrow gauge, effected in May, 1892. He continued there until 1898, when he became Resident Engineer at Cardiff. In that capacity he supervised extensive works at various places between Avonmouth and Tondu, including the Ely Valley and the Western Valleys widenings. On January 1, 1901, he was made Chief Assistant to the Bristol Divisional Engineer, and in 1906 was transferred to a similar position at Gloucester. On January 1, 1911, he entered upon the duties of Divisional Engineer at Neath, and on July 1, 1919, transferred to Reading as Permanent-Way Assistant to the Chief Engineer, becoming Assistant Chief Engineer on November 5, 1920. In January, 1924, he was appointed Joint Chief Engineer, and in January, 1926, on the retirement of Mr. Waddell, became Chief Engineer.

* * *

MR. THOMAS POWELL, for many years Secretary and General Manager of the Pullman Car Co. Ltd., who has recently retired, has been the recipient of a handsome testimonial from the officers and staff of the company. The presentation consisted of a silver salver on which is engraved the following inscription:—"Presented to Thomas Powell, Esq., by the officers and staff of the Pullman Car Co. Ltd. as a mark of esteem on his retirement after nearly 35 years of service as Secretary and Manager. —September, 1928."

* * *

HIS MAJESTY'S Government has nominated Sir Josiah Stamp, G.B.E., and Lord Revelstoke, G.C.V.O., to be the British members of the proposed Committee of Experts which it has been decided to set up in order to frame proposals for the final and definite settlement of the Reparation problem.

* * *

THE Minister of Transport has recently made the following Order:—The Southern Heights Light Railway Order, 1928, authorising the construction of a light railway in the counties of Kent and Surrey from Orpington to Sanderstead.

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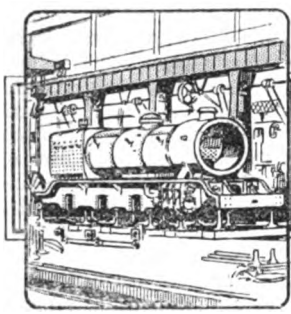
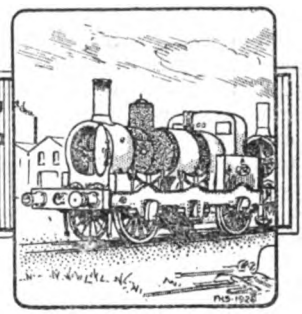


# LOCOMOTIVE MATTERS.



## L.M.S.R.

L.N.W. 2-4-0's Nos. 5018 *Talisman*, 5020 *Delhi*, 5021 *Princess*, and 5031 *Hardwicke*, with several simple "Renowns," are among L.M.S. locomotives working to Peterborough; also Mid. 2-4-0 No. 21 and 0-4-4T No. 1453.—[R. A. DANE.]

"Royal Scot" No. 6141 has been noted fitted with chimney smoke deflectors. Many engines of this class are to be seen in the Liverpool district.—[E. S. APPLEBAUM.]

"Claughton's Nos. 7936, *Croxteth*, 5973 and 5977 regularly work through Rotherham on the "Thames-Forth" and other expresses on the Midland section. No. 5554 *Prospero*, was recently noted at New Street, Birmingham.—["ELEMESS."]

Standard 0-6-0 engines now regularly work into Cardiff in place of L.N.W.R. 0-6-2T's.—[W. JONES.]

2-4-0 No. 227, stated to have been scrapped, has been noted at Sheffield. A night express from Manchester to Southport was recently worked by 0-6-0 No. 4537.—[R. DYSON.]

The 4.8 p.m. from Crewe to Chester is generally worked by a 2-4-0 engine, and Nos. 5029 *Speke*, 5045 *Thomas Carlyle*, and 5078 *Fairbairn*, have been seen on it. L. & Y. 4-4-2 No. 10312 regularly works between Crewe and Manchester *via* Stockport. The down "Mancunian" was recently noted worked by "Claughton" No. 5955, piloted by 2-4-0 No. 5000 *Princess Beatrice*.—["NIAGARA."]

"Prince" 4-6-0's Nos. 5832 and 5833 were recently noted together at Birkenhead (Woodside). Some months ago I noted at New Street, Birmingham, three engines, two coupled together, of which the first three figures of the number were identical (actual numerals forgotten), while the respective terminal figures were 5 and 7 (together), and for the third engine, 6.—[V. WINCHESTER.]

Amplifying and correcting previous statements as to G. & S.W. "Stirling" 4-4-0's, of the 22 original engines, Mr. Manson rebuilt 16, and all these became L.M.S. Nos. 14228-14243. Nos. 14229, 14230 and 14238 were scrapped in 1925. At the end of August last, Nos. 14233-6, 14239 and 14241 (rebuilt by Mr. Manson, but not with domeless boilers) were still in service. Recent G.S.W. withdrawals include 4-4-0's Nos. 14168, 14252 and 14367; 0-4-2's Nos. 17059 and 17071; and 0-6-0's Nos. 17109 and 17175. No. 17109 was the oldest 0-6-0 still at work. It was built at Kilmarnock in 1878 as No. 49. Midland 4-4-0 No. 468 recently worked to Glasgow (Central) on a day excursion from England.—[J. F. MCEWAN.]

The up "Royal Scot" and the down "Mid-day Scot" usually pass near Rugeley, and it is very rarely that more than three minutes separate them. "Claughton" No. 6012 worked the up "Royal Scot" on December 27.—[K. R. VASEY.]

In my last letter I mentioned that there were nine "Claughtons" (apart from the original Caprotti engine) which have been rebuilt with large boilers and Caprotti valve gear, but in your reply to C. R. Prescott and others you misquote me. The five numbers you give are actually those engines which have the cranks set at 135° and were given by me as such when dealing with Mr. Prescott's letter. The other four rebuilt "Claughtons"—which have the normal crank arrangement—are Nos. 5946, 5962, 5975 and 6013.

New 0-6-0 standard superheater goods engines ex Crewe are in traffic up to No. 4556, which is the last of the present order. Of those turned out since the last notice (December issue, page 507), two have been allocated to the Central division (Nos. 4545-6) and ten to the Midland division (Nos. 4547-56). A series of ten 2-6-0 mixed traffic engines ("13000" class) has also been turned out at Crewe, Nos. 13100-9. These engines (at present unpainted and now working from the Crewe South shed) are intended for service on the Northern division. The three remaining 0-6-0 standard shunting tanks ex Bagnall & Co. are now delivered and in service, Nos. 16682-4.

The L.N.W. renumbering was finally completed in November last. Among the



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last engines to be altered were "G1" class No. 2289 and "19" goods class No. 2424 (new Nos. 9190 and 8732). The original total was 3,467, but of this number a great many were withdrawn before the actual renumbering took place. Further 4-6-0 "Claughton" class engines adapted for working over the Northern division include Nos. 5915, 5933 and 5976.

The following 6-ft. 6-in. 2-4-0 "Jumbos" have recently been withdrawn for scrapping: Nos. 5009 *Princess Helena*, 5026 *Duchess*, 5030 *Madge*, 5046 *Envoy*, 5051 *Sir Hardman Earle* and 5058 *Alma* (old Nos. 1517, 1519, 2002, 865, 890 and 2185 respectively). Other withdrawals include two further 0-6-0 D.X. type engines, Nos. 8000 and 8064, the former of which was built at Crewe in September, 1858.—[C. WILLIAMS.]

## L.N.E.R.

G.C. 0-6-0 No. 6078 was noted recently at Thetford. Information as to this engine is desired.—[H. D. HEWITT.]

2-4-2T No. 8312 (ex Colne Valley) recently went to Ipswich for repairs. 0-6-0T No. 8317 (ex Mid-Suffolk) is thought to have been scrapped. Information is desired as to small tank engine *Lady Susan*, used in the construction of the Mid-Suffolk Light Railway.—[F. W. GRIBBLE.]

G.E. 0-6-0T's Nos. 7198 and 7370 are shunting at Trafford Park and Manchester Central. C.L.C. Liverpool-Manchester expresses are now sometimes piloted. The 8.30 p.m. ex Liverpool is often worked by a G.N. 4-4-2, usually No. 3280 or No. 4420.—[R. DYSON.]

New 0-6-2T's Nos. 2667-8-9 and 2670-1 have been delivered from Hawthorn, Leslie & Company's works. New 0-6-0's Nos. 2717-8-9 have been noted. G.C. 2-8-0's Nos. 6544 and 6550 have been noted north of Newcastle.—[W. L. CLAYDEN.]

0-6-2T's Nos. 2662-71 are at King's Cross. N.E. 4-4-2 No. 2211 recently worked an excursion into King's Cross.—[G. R. GRIGS.]

L.D.E.C. 0-6-0T No. 6407 was noted recently at Sheffield (Victoria). Nos. 6408-6411 (of the same class) work between Wrexham and Connah's Quay.—["WIRRALITE."]

New G.E. 4-6-0's Nos. 8576-9 are now in service. G.N. 0-6-0 No. 4113 and G.C. 0-6-0's (styled by G.E. enginemen "Puggies") Nos. 5168, 5239, 5317, 5903, 6003 and 6079 (with others previously noted) have been working in the Norwich area, also new 0-6-0's Nos. 2711-5. Sentinel-Cammell cars Nos. 12E and 13E, working in the Norwich district, are termed "Camels."—[R. W. FITZJOHN.]

New 0-6-0's Nos. 2712 and 2720 were noted at Stratford, and No. 1266 at Colchester. 0-6-0T No. 7364 has been working the Kelvedon-Tollesbury line.—[J.E. KITE.]

G.C. 0-6-0's Nos. 5289 and 5553, the latter with outside frames, were noted at Cambridge; also N.E. 0-6-0 No. 1034. Information is desired as to the type of feedwater heater fitted to No. 8547, which appears not to be the A.C.F.I. pattern used for No. 8517.—[V. WINCHESTER.]

4-6-2T's ("A5" Class) Nos. 1712, 1719 and 1750 are at Gateshead. They are in the same link as 4-4-4 three-cylinder tank engines. Information is desired as to the working of "A5" 4-6-2T's in the Saltburn district and the loads worked; also the duties in this area as compared with 4-4-4T's. The 7.17 p.m. Middlesbrough express from Newcastle was recently worked by a 0-4-4T with eight bogie coaches.—["Loco., NEWCASTLE."]

G.N. 4-4-0's, and occasionally 2-6-0's, usually work into Stafford.—[K. R. VASEY.]

The newest "Pacific" No. 2747 is named *Coronach*. Yorkshire Engine Company's 0-6-2T No. 2684 has arrived at King's Cross. Owing to the cancellation of the Pullman express on Christmas Day, the Leeds "Director" 4-4-0 (No. 5507) worked home on the 12 noon express ex King's Cross, piloted to Grantham by G.N. "Atlantic" No. 4431. As the "Director" is painted black, the combination looked particularly curious.—[R. A. H. W.]

New three-cylinder 4-6-0's Nos. 2800-2809 are in service. They were built at the Hyde Park Works of the North British Locomotive Co. Ltd., Works Nos. 23803-23812. Before going south, they worked between Glasgow and Edinburgh and north to Dundee.—[F. LEMMON, A. B. CROMPTON, R. A. READ, and others.]

4-6-2's Nos. 2545 *Captain Cuttle* and 4480 *Enterprise* have been working on the Waverley route from Carlisle. New 0-6-2T's Nos. 2685-6 are working on the N.B. section. Old N.B. 0-6-0 No. 85 has gone to Cowlairs, presumably for scrapping; this retained N.B. colours and its N.B. number. No. 329 *Inverness-shire* has been working on the N.E. section.—[R. A. READ and "PERTHSHIRE."]

## G.W.R.

New 2-6-2T's Nos. 5547-5555 are now running, also 0-6-2T's Nos. 6690-6699. Rebuilt 2-6-2T's Nos. 5118, 5119 and 5143 have been noted at Paddington. 4-6-0 No. 4024 is *Dutch Monarch*, not *Egyptian Monarch*.—[R. E. DANIELLS.]

4-6-0 No. 2909 *Lady of Provence*, noted at Chester, has straight outside foot-plating and has a lever for reversing instead of wheel and screw.—[F. H. B. BROWN.]

Two-cylinder 4-6-0 locomotives regularly work Birmingham and South Wales

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expresses, and occasionally four-cylinder 4-6-0's, including "Castles," are employed. 2-4-2T No. 3612 has been noted several times on the Liverpool and Manchester-Cardiff service, apparently from Pontypool Road. "56XX" and "66XX" engines have replaced T.V., Rhymney and Barry engines on certain duties. 2-6-2T's of the "39XX" class work regularly on Cardiff-Barry trains.—[W. JONES.]

No. 111 *Viscount Churchill* has a "King" class tender, as also No. 4073 *Caerphilly Castle* and No. 4084 *Aberystwyth Castle*. New "Hall" class 4-6-0's in service are Nos. 4901-2-3-4.—["KING EDWARD VII," B. HEWITT and G. F. RAYNOR.]

2-8-0 No. 4701 was recently noted fitted with extended roof cab, but without side windows. Nos. 5000 and 6000 were recently noted at Paddington side by side. Both a "Flower" and a "Castle" have been noted on rail-motor service at Dawlish. A "55XX" class 2-6-2T has been similarly working on the Heathfield line.—[JOHN FOX.]

The names appropriated to the new "Hall" class engines are :—

| | | | |
|---|---|---|---|
| *Saint Martin* .. | 4900 | *Bowden Hall* .. | 4911 |
| *Adderley Hall* .. | 4901 | *Berrington* ,, .. | 4912 |
| *Aldenham* ,, .. | 4902 | *Baglan* ,, .. | 4913 |
| *Astley* ,, .. | 4903 | *Cranmore* ,, .. | 4914 |
| *Binnegar* ,, .. | 4904 | *Condover* ,, .. | 4915 |
| *Barton* ,, .. | 4905 | *Crumlin* ,, .. | 4916 |
| *Bradfield* ,, .. | 4906 | *Crosswood* ,, .. | 4917 |
| *Broughton* ,, .. | 4907 | *Dartington* ,, .. | 4918 |
| *Broome* ,, .. | 4908 | *Donnington* ,, .. | 4919 |
| *Blakesley* ,, .. | 4909 | *Dumbleton* ,, .. | 4920 |
| *Blaisdon* ,, .. | 4910 | | |

In all, 92 locomotives have been built at Swindon Works during 1928, including 14 of the "King" class, which makes a total of 20 of these engines now in service. Forty of the "55XX" class (2-6-2T type), for mixed traffic and branch services, and 33 of the "56XX" class (0-6-2T type), for mineral services in South Wales, have been constructed; five engines of the new 4-6-0 type, two-cylinder "Hall" class, 80 of which are under construction, have also been completed ready for service.

In addition, 50 locomotives of the "66XX" class, built by Armstrong, Whitworth & Co., at Newcastle, have been put into service, and some of the 50 engines of the "57XX" class (0-6-0T-type) at present being built by the North British Locomotive Company at Glasgow are also being de-delivered.

The following new engines have been turned out of Swindon Works since October 10 :—Goods, 2-6-2T, Nos. 5547—5559. The following new engines have been received from Sir W. G. Armstrong Whitworth & Co., Newcastle: Goods, 0-6-2T, Nos. 6690-6699.

The policy of rebuilding the more useful types of the Amalgamated Companies' engines has been continued. Twenty-five of these engines have been reconstructed, and 20 of them fitted with new G.W. standard pattern boilers.

Out of a total of 216 engines condemned, 71 were from the "absorbed lines," and 145 were original Great Western stock. Of these the most interesting were (1), the *Alliance*, No. 104—which was the last of the three French engines, (2), two of the "Brunel" engines (one broad gauge), built in 1886 and 1888 with 7-ft. 2 in. driving wheels, reconstructed in 1884, and later converted to 6-ft. 8½-in. wheels, and (3), five of the famous "City" class engines.—[G.W.R. MAGAZINE.]

## S.R.

Nos. E763, E764, E768, E852 and E853 have high-capacity six-wheeled tenders. No. E854 *Howard of Effingham* has a bogie tender. The type of lamp-iron used on the Eastern Section is now becoming standard on the Western Section. 4-6-0 No. E835 was recently noted at Bromley (South).—["SIR FRANCIS DRAKE."]

Nos. E0155 and E0400 were recently noted at Reading.—[R. E. DANIELLS.]

Class "E1" 0-6-0T's Nos. B124, B135 and B608 have been rebuilt as 0-6-2T's. Nos. B697 and B610 are in hand. It is understood that several "D1" class 0-4-2T's are being fitted with modified cabs and bunkers for West of England branch line service. No. E857 *Lord Howe* is now in service. The "496" and "823" classes of 4-6-0 engines are to be painted passenger green and several are now running. 0-4-2's Nos. E538 and E553 have been scrapped and several others of the class withdrawn.—["745 TINTAGEL."]

"Adams" 4-4-0 No. E681 now has a "Drummond" chimney. 2-4-0T No. W18 *Bonchurch* has been withdrawn. No. E856 *Lord St. Vincent* is now in service.—[783 "SIR GILLEMERE."]

During 1928 an order for 10 "Lord Nelson" class engines was executed, and seven of these engines are already in service. An order for a further five engines will bring the total number of engines of this class to 16 by the end of 1929.

The names chosen for these 16 engines are :—

| | |
|---|---|
| 850 *Lord Nelson.* | 854 *Howard of Effingham.* |
| 851 *Sir Francis Drake.* | 855 *Robert Blake.* |
| 852 *Sir Walter Raleigh.* | 856 *Lord St. Vincent.* |
| 853 *Sir Richard Grenville.* | 857 *Lord Howe.* |

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858 *Lord Duncan.*
859 *Lord Hood.*
860 *Lord Hawke.*
861 *Lord Anson.*
862 *Lord Collingwood.*
863 *Lord Rodney.*
864 *Sir Martin Frobisher.*
865 *Sir John Hawkins.*

The last engine of a batch of 15 mixed traffic 4-6-0 type, class "S.15," was completed at Eastleigh, and also 10 passenger engines of the 2-6-0 type, Class "U" have been built at Brighton, while two engines of the same class of an order of 10 have been turned out of Ashford Works.

The first of an order of eight three-cylinder shunting tank engines of the 0-8-0 type is nearing completion at Brighton. Eight more of the Stroudley 0-6-0 type tank engines, Class "E.1" Central section, are being altered to 0-6-2 type for working the Torrington-Halwill Branch.

New work in hand includes five three-cylinder mixed traffic engines of the 2-6-0 type with 5 ft. 6 in. wheels, 10 three-cylinder passenger engines of the 2-6-0 type with coupled wheels 6 ft. diam., and 10 large three-cylinder engines of the 4-4-0 type of a capacity approaching that of the "King Arthur" class engines, and intended to work the Eastern Section of the line. —[SOUTHERN RAILWAY MAGAZINE.]

### Somerset & Dorset Joint Railway.

Two new 0-6-0T's, Nos. 19 and 20, constructed by Bagnall's, of Stafford, are now in service.—[L. B. HEWITT.]

### Great Southern Railways (Ireland).

Recent reference to 4-4-2 No. 231 should have been to 4-4-0 No. 321. 0-6-0T No. 420, also mentioned, must be 0-6-0T No. 204. —[K. DAVISON.]

The new 2-6-2T No. 850 is attached to Grand Canal Street shed and works the "mail" from Bray every evening. 0-6-0 No. 591 (formerly M.G.W.R. No. 137 *Maynooth*) worked from Bray shed for a few days recently. It has been fitted with a new boiler and G.S.W. type cab.—[C. J. COGHLAN.]

Clayton rail cars Nos. 358 to 363 have been delivered to Inchicore; No. 362 has been working between Westland Row and Dalkley, and another between Harcourt Street and Foxrock. Renumbered M.G.W.R. engines include Nos. 44 (0-6-0) now No. 641, and No. 658 (2-4-0) formerly No. 34 *Aurora*. —[K. A. MURRAY.]

### Northern Counties Committee.

Several engines, both 4-4-0 and 2-4-0, have been rebuilt. The former have been fitted with different type boilers and superheaters. Nos. 24, 28 and 3 *Galgorm Castle* have been thus rebuilt. Most of the passenger engines are now appearing in the red livery of the L.M.S.—["TELESCOPE."]

Letters have also been received from F.W. and C. G. Johnson and G. C. Caws, S. Lucas, G. F. Raynor, "Tintagel Castle," "Sir Francis Drake," H. L. Lacey, A. J. Agbee, "King Edward VII," D.P.G.F., "Hockerill Halt," K. Harris, R. Gray, E. Maxwell, "Saddleback," and others, in some cases duplicating information given above. It will be understood that when inquiries are answered by items included in the current issue, there is no need to insert duplicating notes.

**Owing to pressure on space the section headed "Overseas Railways as Seen by Our Readers" is unavoidably held over until Next Month.**

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**AFTERNOON BOURNEMOUTH EXPRESS, SOUTHERN RAILWAY.**

**Rebuilt 4-6-0 Locomotive No. 737.**

**(From a photograph by H. Gordon Tidey.)**

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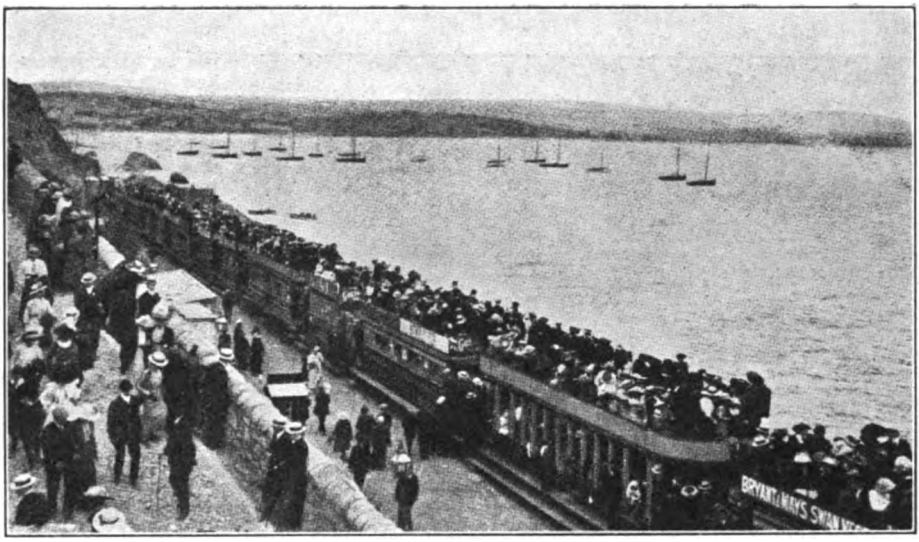

HEAVY TRAIN LEAVING MUMBLES.

# The Swansea and Mumbles Railway. [No. I.]

By CHARLES E. LEE.

THE early history of this interesting little South Wales line has many times been recounted, notably in a souvenir pamphlet issued in 1904 on the occasion of the centenary of its incorporation, and also in an article entitled "The Oldest Railway in the World" published in the RAILWAY MAGAZINE for July, 1908. In addition some supplemental notes were published in the RAILWAY MAGAZINE for April, 1923. As, however, its recent electrification places it in the unique position of having passed through the successive stages of animal, steam locomotive and electric traction, it is of interest to preface an account of its new equipment with some notes upon its origin and subsequent development. At the outset it is worth examining the claims which were advanced in the souvenir booklet that this is the "Oldest Line in the Kingdom," or the even wider one suggested by the title to our own article in 1908.

As it is generally known, railways or tramroads of a sort had been in existence in the mining districts, chiefly of the north and midlands, since the time of Queen Elizabeth, but these were all private concerns reserved for the exclusive use of their owners. The earliest application to Parliament for powers to construct a public railway was made at the beginning of the nineteenth century, and the Surrey Iron Railway Company, incorporated on May 31, 1801, had the honour of being the pioneer line of this character. This was followed by the Carmarthenshire and the Sirhowy in 1802, and the Croydon, Merstham & Godstone in 1803. Three of these have long since been abandoned, although the C.M. & G. was nominally taken over by the London & Brighton Company. The remaining one, the Sirhowy, has been entirely remodelled and for many years has formed part of the old L.N.W.R. system.

Following these came the Oystermouth line which forms the nucleus of the Swansea & Mumbles system and is therefore entitled to be considered the oldest public railway or tramroad. Further, although designed primarily for mineral traffic, like other early lines, it soon



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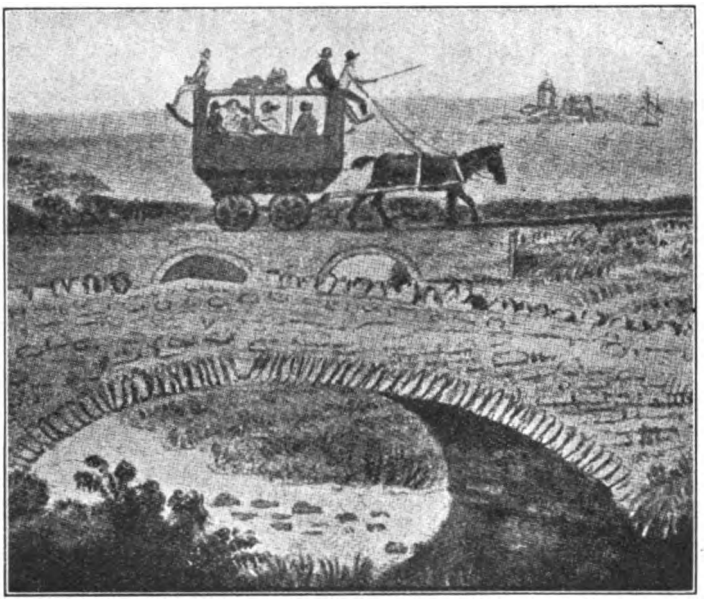

OYSTERMOUTH "TRAIN" CROSSING BLACKPILL BRIDGE ABOUT 100 YEARS AGO.

developed a moderate passenger traffic, which, so far as an exhaustive search of historical records reveals, was the first railborne passenger traffic ever carried.

In the early years of the last century an influential Swansea committee under the leadership of Henry Charles, Duke of Beaufort, proposed the construction of a railway or tramroad with several branches along the eastern side of the Gower peninsular through a district rich in mineral products, chiefly to facilitate the carriage of limestone, coal and iron ore from the extensive quarries and mines thereabouts. An Act of Parliament was obtained on June 29, 1804 (44 George III, cap. 55) incorporating The Oystermouth Railway or Tramroad Company, and this was the fifth Act for a public railway to be granted by Parliament. The preamble indicates the main line of route and the various branches in the following terms :—

. . . to communicate with the *Swansea* Canal near a certain Place called *The Brewery Bank*, within the Town of *Swansea* in the County of *Glamorgan* to, or near to a certain Field called *Castle Hill*, in the Parish of *Oystermouth* in the said County of *Glamorgan* ; and also the making and maintaining of a Branch of such Railway or Tramroad, to communicate therewith, from a certain place near the *Mount* in the said Town of *Swansea*, in the County aforesaid, to, or nearly to, *Swansea* Pier ; and likewise the making and maintaining of another Branch of such Railway or Tramroad, to communicate therewith from a certain place near *Black Pill*, to or nearly to a certain place called *Ynys* in the Parish of *Swansea* in the said County of Glamorgan. . . .

A point of particular interest about this Act is that it was so worded as to authorise mechanical traction, powers which were sufficient to cover the introduction of steam locomotives nearly three-quarters of a century later. There can be little doubt that it was the earliest Act to be framed in this manner.

The line was opened in 1807 using, of course, horse traction. It was originally laid as a plateway, the rails consisting of 3 ft. lengths of angle iron fastened to blocks of granite by means of dog spikes, and the truck wheels being unflanged. The total length was about 6 miles. In the very early days of the enterprise, the company commenced carrying passengers between Swansea and Oystermouth at a return fare of 2s. No specific powers were possessed for this traffic, but the company was not the only one to act on its own authority in this manner, at least two other lines of the pre-Stockton & Darlington period doing likewise, namely, the Kilmarnock & Troon (incorporated in 1808 and opened in 1810) and the Stratford & Moreton (incorporated in 1821 and opened in 1826).

At first passengers were accommodated in vehicles improvised from mineral wagons. In 1816 special covered coaches were constructed for the service, which, according to contemporary prints, were four-wheeled vehicles of the stage-coach type drawn by a single horse.

The history of the line during the next 50 years is almost untraceable ; it simply continued its ordinary business without recourse to Parliament for further powers

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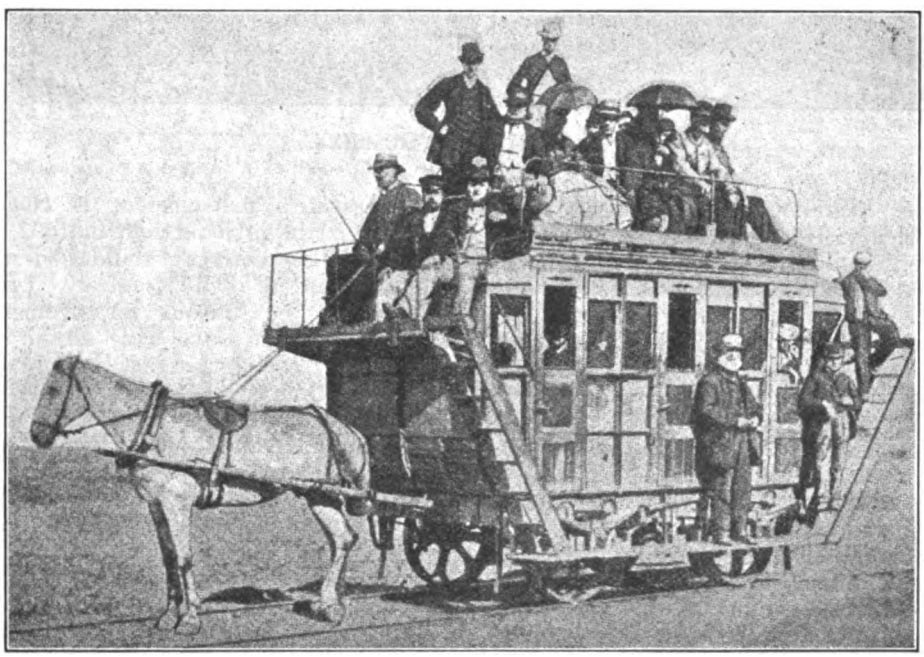
and without making any important changes which would justify record in contemporary literature. An old print of 1840 shows a passenger car crossing Blackpill Bridge which is practically identical with the type introduced in 1816. Subsequently the track was relaid with flat-bottomed edge rails weighing 28 lb. to the yard, spiked to transverse wooden sleepers. This change probably took place in the early 'fifties about the same time as the South Wales Railway (now G.W.R.) was opened through Swansea, and was necessitated by a physical connection with the latter. New rolling stock was introduced during this period, which, judging from engravings of 1855, 1860 and 1865 respectively, was partly of the toast-rack variety drawn by two horses in single file, and partly of the old "omnibus" type with stairs at each end leading to knife-board seats on the roof.



HORSE-DRAWN TRAIN ON THE OYSTERMOUTH RAILWAY ABOUT 1855.

About this time the line got into serious financial difficulties, and in 1865 possession was taken by a mortgagee. It is apparently impossible to trace out the details of this transaction, although it is a fair assumption that the mortgage was originally entered into to obtain funds for the relaying of the track and the provision of the new rolling-stock.

Thus far the Oystermouth Railway had been unaffected by competition from any other system, but on December 14, 1867, a line was opened from Swansea to Pontardulais by the Llanelly Railway, and afterwards formed as a separate undertaking entitled the Swansea and Carmarthen Railway, which paralleled the older line from Swansea nearly to Blackpill, where it crossed over on a bridge and followed closely along the course of the Clyne Valley branch on to Killay and thence to Gowerton. This line was acquired by the L.N.W.R. under their act of July 21, 1873.

In 1877, one of the most important changes in the history of the line took place, namely, the change over from animal to steam traction. The permanent way was again relaid, this time with 56-lb. rails, and steam locomotives of the enclosed type, used largely on steam street tramways at that time, were introduced. As pointed out earlier, the original act of 1804 covered the use of steam engines, and therefore no special act was necessary. The change over was strenuously opposed by many influential local



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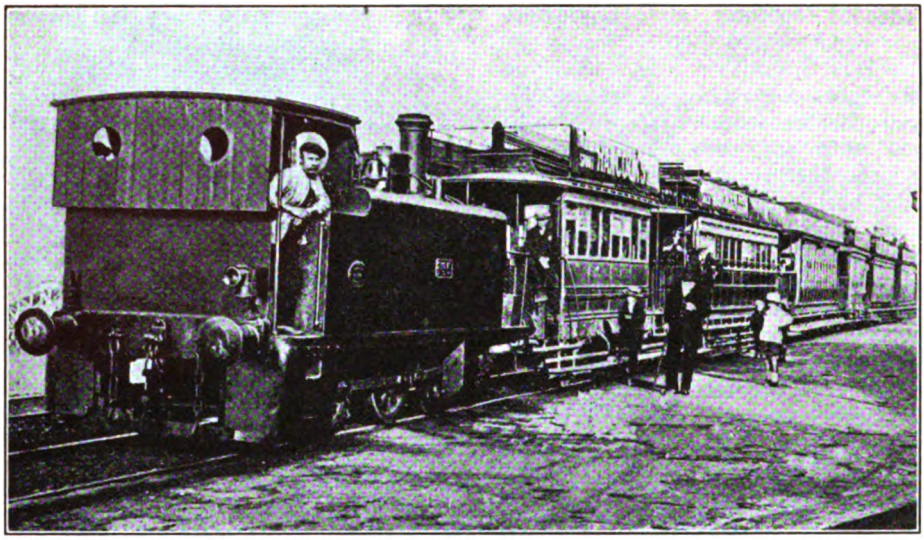

STEAM TRAIN AT MUMBLES.

people, including Lord Swansea (then Mr. Henry Hussey Vivian), Mr. Lewis Llewelyn Dillwyn, M.P., and Dr. James Rogers (then Mayor of Swansea), largely on the grounds that, as the line ran alongside the public road, the risk of accidents was high. That their fears were not realised is shown by the fact that, unlike certain similarly constructed systems, the percentage of accidents has always been remarkably small.

About 1877 also the Swansea Tramways Company obtained running powers from a junction with their system at St. Helens, about 73 chains from Rutland Street, to Oystermouth, and for a time the horse-drawn tramway vehicles were worked in among the steam trains, causing considerable difficulty.

On March 31, 1879, a limited company entitled the Swansea & Mumbles Railway Co. Ltd., was incorporated, and purchased the properties. At some later period, the Swansea Improvements & Tramways Company, which had been formed in 1874, worked the line under a lease which expired in 1890. A syndicate then took over the operation and continued up to July, 1893, on the 26th of which month the Swansea & Mumbles Railways, Limited, was registered in reconstruction of the old company. It purchased the undertaking and took over the working from the syndicate. The relatively short period under the syndicate's management is chiefly notable for the introduction, in 1892, of saddle-tank locomotives of standard design in place of the enclosed " tramway " type.

Thus far the various improvements which had taken place were all in the direction of relaying the track and providing new rolling stock, no extensions of the original line having been made. On August 26, 1889, an Act of Parliament was obtained incorporating a new company, known as the Mumbles Railway & Pier Company, with powers to build a new railway 1 mile 2 furlongs 2 chains long from an end-on junction with the old line at Dunns (Oystermouth) to Mumbles Head, and to construct a deep-water pier at the latter place. After two further Acts, of 1892 and 1897 respectively, had been obtained, granting extensions of time for completing the works, the line and pier were opened for traffic on May 10, 1898. Before the opening took place, further application had been made to Parliament for authority to extend the new line from Oystermouth to Blackpill, a distance of 1 mile 3 furlongs 8 chains ; this was granted by an Act which received the Royal Assent on July 25, 1898. The extension was completed and opened on August 26, 1900, bringing the total of the new line up to 2 miles 60 chains. The old Oystermouth line between the same points, which had run upon the

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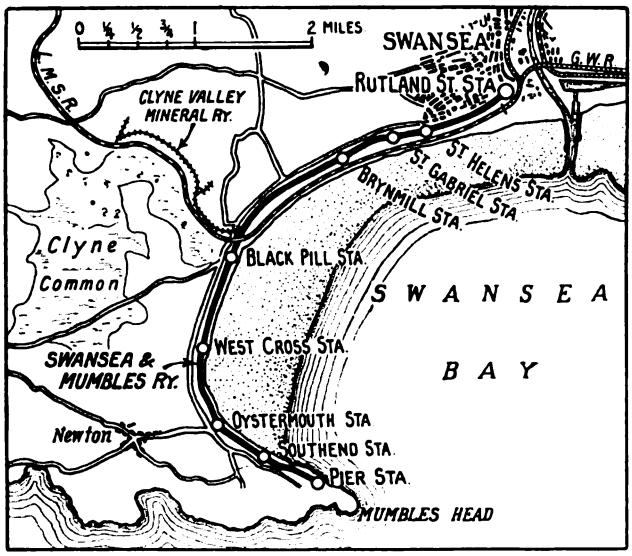


MAP OF SWANSEA AND MUMBLES RAILWAY.

side of the narrow highway, was thereupon, abandoned in favour of the new line constructed on the sea shore, a change which facilitated the traffic on the railway, in addition to effecting a great public improvement. The abandonment was legalised by the Oystermouth Railway or Tramroad Act of 1899, which Act it will be noted was the first to be obtained by the original line subsequent to that of incorporation in 1804; this is probably the only case of a railway conducting its affairs over so long a period as 95 years without recourse to Parliament.

The Swansea & Mumbles Railways Limited, formerly had a large interest in the Mumbles Railway & Pier Company and worked its undertaking for the first year. In June, 1899, the majority of these shares were distributed to ordinary shareholders in the Swansea & Mumbles Company at the rate of one Mumbles share for every five Swansea shares, the latter thereupon being written down by £2 each. This rearrangement was made in consequence of the lease for 999 years of both undertakings to the Swansea Improvements & Tramways Company as from July 1, 1899. The lease was sanctioned by the same Act of 1899 just mentioned.

During the next few years the line was almost entirely relaid with 85-lb. rails, and additional rolling-stock provided. Further, various alterations were made to the pier and buildings, including the erection of a large refreshment room, which entailed, in all, an expenditure of nearly £40,000.

The remainder of the historical part is briefly told. Application was made in July, 1924, by the lessees, the Swansea Improvements & Tramways Company, to the Ministry of Transport, under the Railways (Electrical Power) Act, 1903, as the result of which the Minister made the following order in May, 1925:—

The Oystermouth Railway or Tramroad and Mumbles Railway (Electrical Power) Order, 1925, an order made under the above-named Act to facilitate the introduction of electrical power on certain railways or tramroad worked by the Swansea Improvements and Tramways Company.

The electrical equipment will be described later so that it suffices here to say that preliminary trials took place on Friday, July 6, 1928, over the Rutland Street end of the line. The railway as at present worked runs from Swansea, near the L.M.S.R. station, to Mumbles Pier.

In order to facilitate a close co-operation between the electrified line and the local bus services, the lease was transferred in July, 1927, to an associated company under the same management—The South Wales Transport Co. Ltd.—as from January 1, 1927.

(*To be continued.*)



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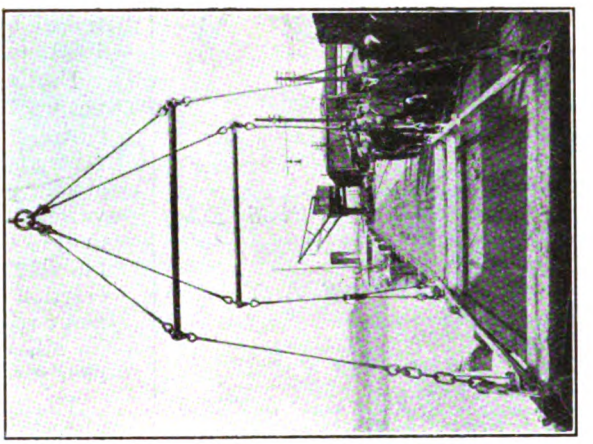
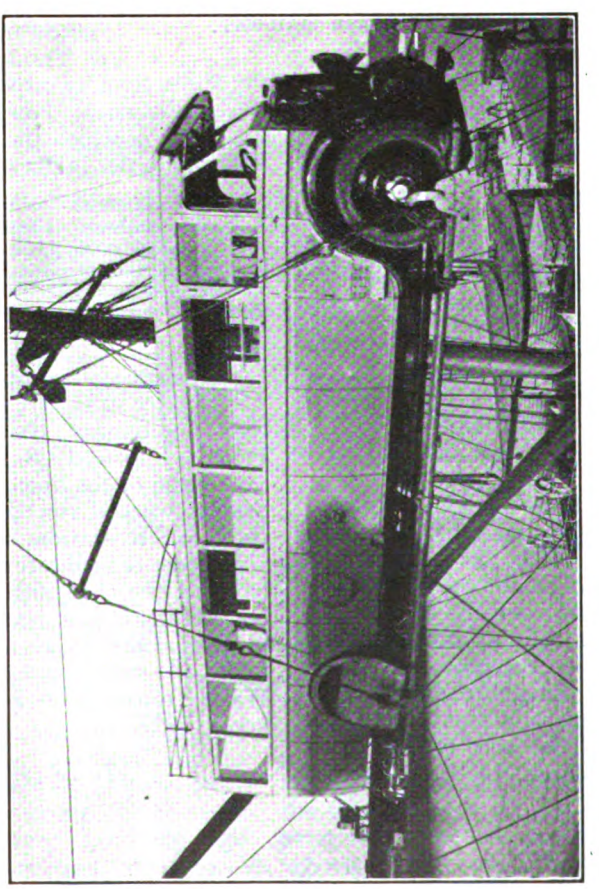
TRANSFERRING MOTOR VEHICLES AT HEYSHAM, L.M.S.R.





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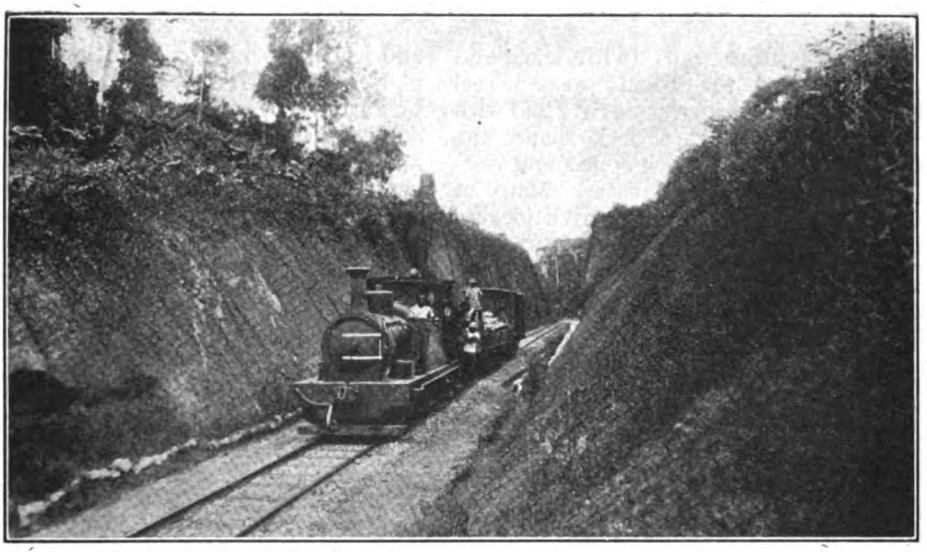

REBUILT TANK ENGINE "ODA" ON STAFF TRAIN AT MILE 71 SUMMIT.

# The Gold Coast Government Railways. [Central Provinces Line.]

By G. TAYLOR.

THE Gold Coast ports of Accra, Sekondi, Cape Coast Castle, Axim, Saltpond and several more of a minor character have always been greatly handicapped by the lack of deep-water jetties and wharves where the ocean-going cargo and passenger vessels could load and unload, all the various transhipments hitherto having been made by means of surf-boats and lighters.

The approaching completion of the deep-water harbour and docks at Takoradi, 6 miles west of the old port of Sekondi, has made railway expansion imperative, it being extremely unlikely that the expensive transhipment methods necessary at many small ports will survive the convenience and quickness provided by the large new port.

The map on page 176 shows the relation of the new Central Province Railway to the existing railways and ports, and it will be observed that all the road-heads of the rich hinterland are tapped by it. The new line runs roughly in an east and west direction, and from its junction with the main Sekondi-Kumasi line at Huni Valley to the terminus at Kade is 98 miles in length.

It was found necessary to entirely rebuild Huni Valley station about ¼ mile south of its old position. The new layout consists of a long island platform on which stand the station buildings, the main-line trains in both directions using the western side, while the C.P.R. trains run from the eastern.

The north end of the area is laid out as a goods station with half-a-dozen sidings and loops, while a connecting curve between the main and branch lines ¼-mile to the north forms a triangle for turning locos., or an avoiding line should future traffic developments demand it. The whole station area is on the level and situated on swampy land in the middle of the wide shallow valley from which it takes its name.

Leaving the eastern side of the station, the C.P.R. at once turns due east on a sharp curve and climbing by easy grades, enters almost at once the thick forest belt covering the whole of the Central Province. The whole line is laid with



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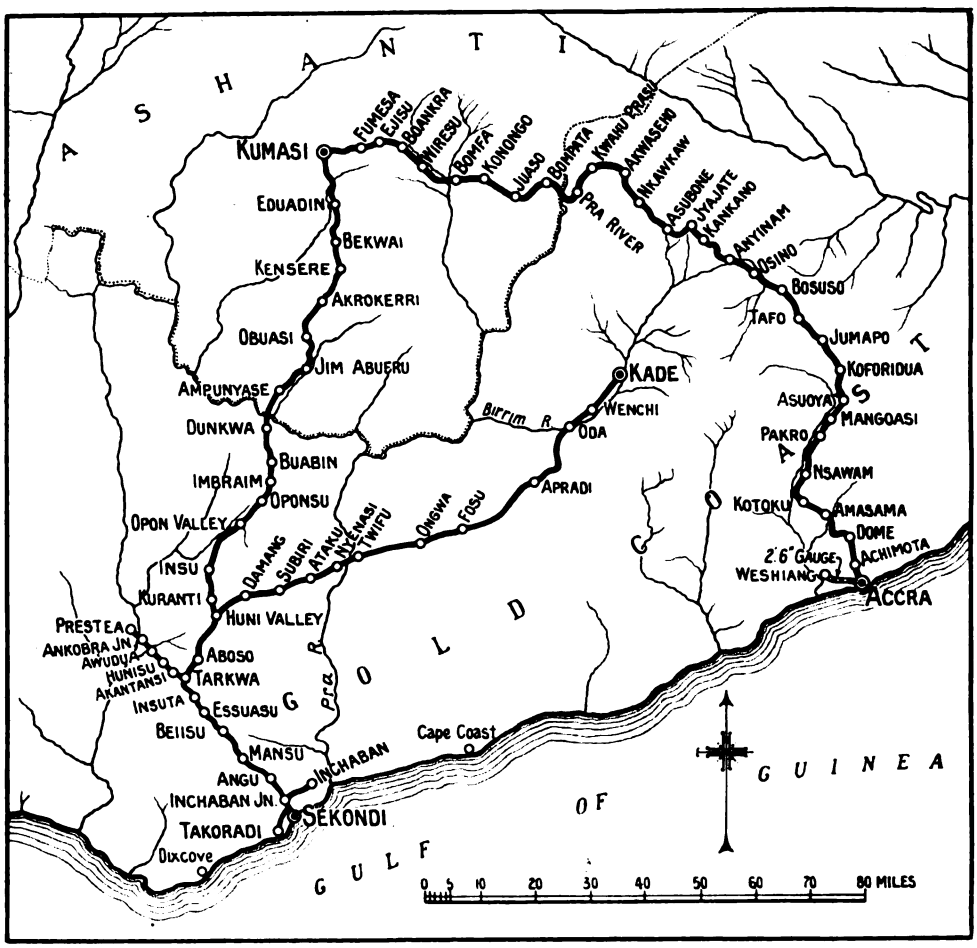
60-lb. flat-bottom rails (with staggered joints), secured to dished pressed-steel sleepers. Points and crossings are laid with timber sleepers, as are deck spans, the rails being secured by dog spikes and resting on cast-iron camber-plates. Many of these timbers are cut and treated locally, but some are imported ready for use. Most of the sidings and passing loops are laid and Kade, are built on essentially the same plan, being 60 ft. by 15 ft. in length and breadth with baggage room on the left, staff and booking offices to the right, and an open fronted waiting-room in the centre.

The walls are built of concrete blocks made on the site, while all roof timbers, doors, windows and fittings are of locally-




MAP OF THE GOLD COAST GOVERNMENT RAILWAYS.

with old 40-lb. track of a similar nature taken from relaid portions of the main lines. The first station, Damang, is reached at Mile 5; here one passing loop is provided, the points being guarded, as is the case with each station on the line, by outer stop signals 700 ft. away and worked from a platform ground frame.

Station buildings on the whole railway, with the exception of those at Huni Valley cut mahogany or cedar, treated with solignum or purple-oxide paint. Behind each station is the stationmaster's house, a three-roomed building with wide front veranda; staff accommodation being provided by two, three, or four-roomed terrace houses set well back from the platform.

All station platforms are faced by concrete retaining walls; the usual length of

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platforms is 400 ft., the whole area being fenced in with concrete posts and barbed wire.

No goods accommodation other than the single loop is provided at either this or the next station, Subiri, which is situated about mile 12. The line steadily rises after leaving Damang over grades up to 1 in 80. Maximum grades are always in favour of exports, that is, trains running to the coast never face more than 1 in 100, while empties returning from thence negotiate 1 in 80 grades. The local summit level is reached at mile 16, which is situated in a terraced earth cutting 50 ft. in depth. After mile 16, there is a steady descent to the western scarp of the Prah Valley, whose summit is reached near mile 25 at the roadside station of Nyenasi. In anticipation of future cocoa traffic, a concrete goods wharf, 330 ft. in length and at truck floor level, is built on a special loop, storage room being provided by a 60-ft. by 30-ft. elliptical-roof iron goods shed; a feeder road allows motor traffic to come right on to the platform.

Leaving Nyenasi, the line begins an immediate descent to Prah River, which is reached at mile 29: this is bridged 60 ft. above stream level by deck spans carried on concrete piers. There are two end spans of 60 ft. and three central spans of 100 ft. During the two years in which the bridge was under construction by Sir William Arrol, all traffic was carried over the river on a temporary timber bridge. After the opening of the permanent bridge, the temporary one was taken over by the Public Works Department, and converted into a single-track road, and is thus shown in the illustration on this page.

**BRIDGE OVER THE PRAH RIVER.**

Temporary Bridge alongside now used for road traffic.

Ataku, the first important station, at mile 18. Here, two passing loops are provided, and extra dead ends to accommodate timber trains for the West African Mahogany Company, who make this place their local headquarters. The rough-cut logs are loaded on to bogie wagons by means of hand cranes in the station yard, any outlying timber being handled by travelling cranes running on special Sunday trains. An emergency 1,800-gallon water tank filled by a double-throw hand pump at the west end of the platform provides against cessation of supplies at the regular watering stations.

After leaving Ataku, the line ascends to

Immediately after crossing the track, the line enters a cutting through immense deposits of river shingle which have been employed as ballast over a distance of 20 miles in each direction. At mile 30 is situated the station of Twifu, consisting of the usual two loops and goods station.

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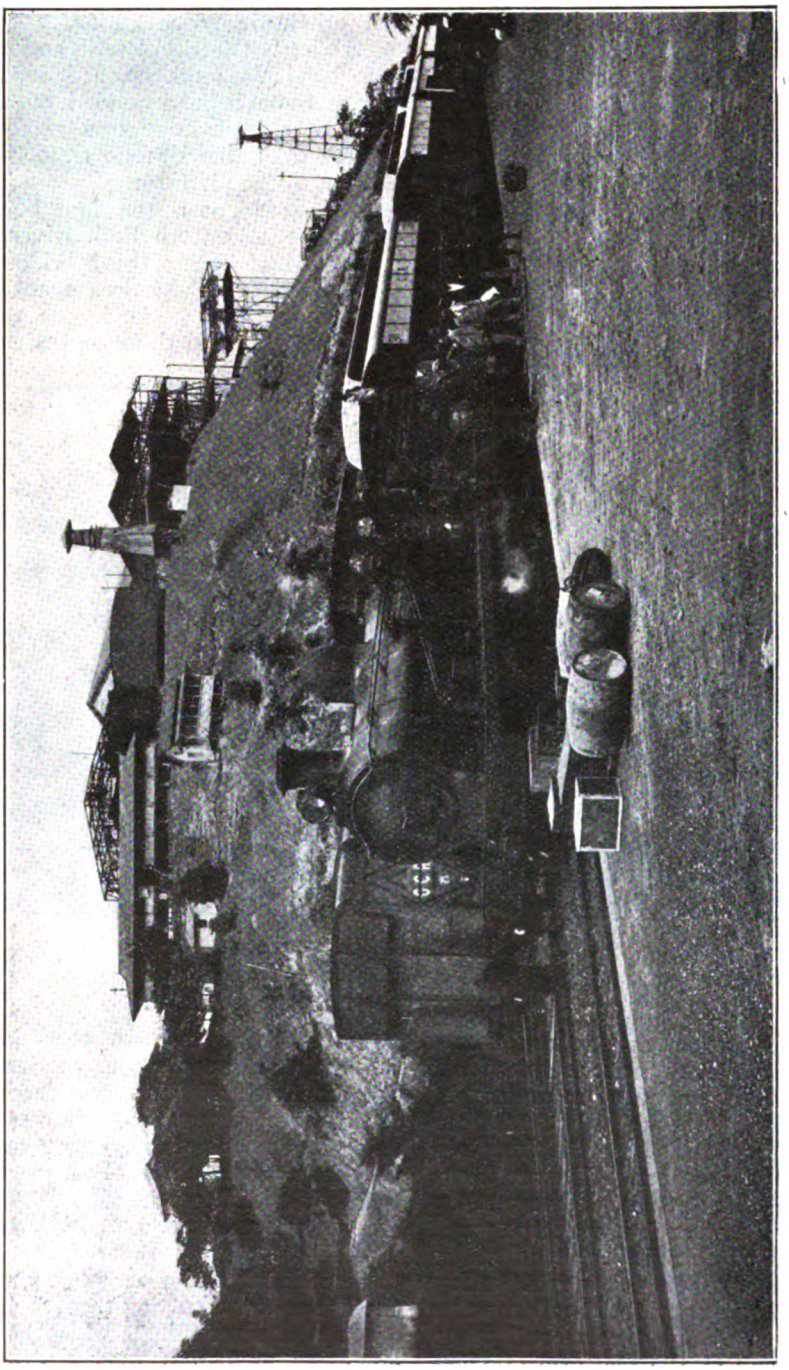

PASSENGER TRAIN AT PRESTEA.

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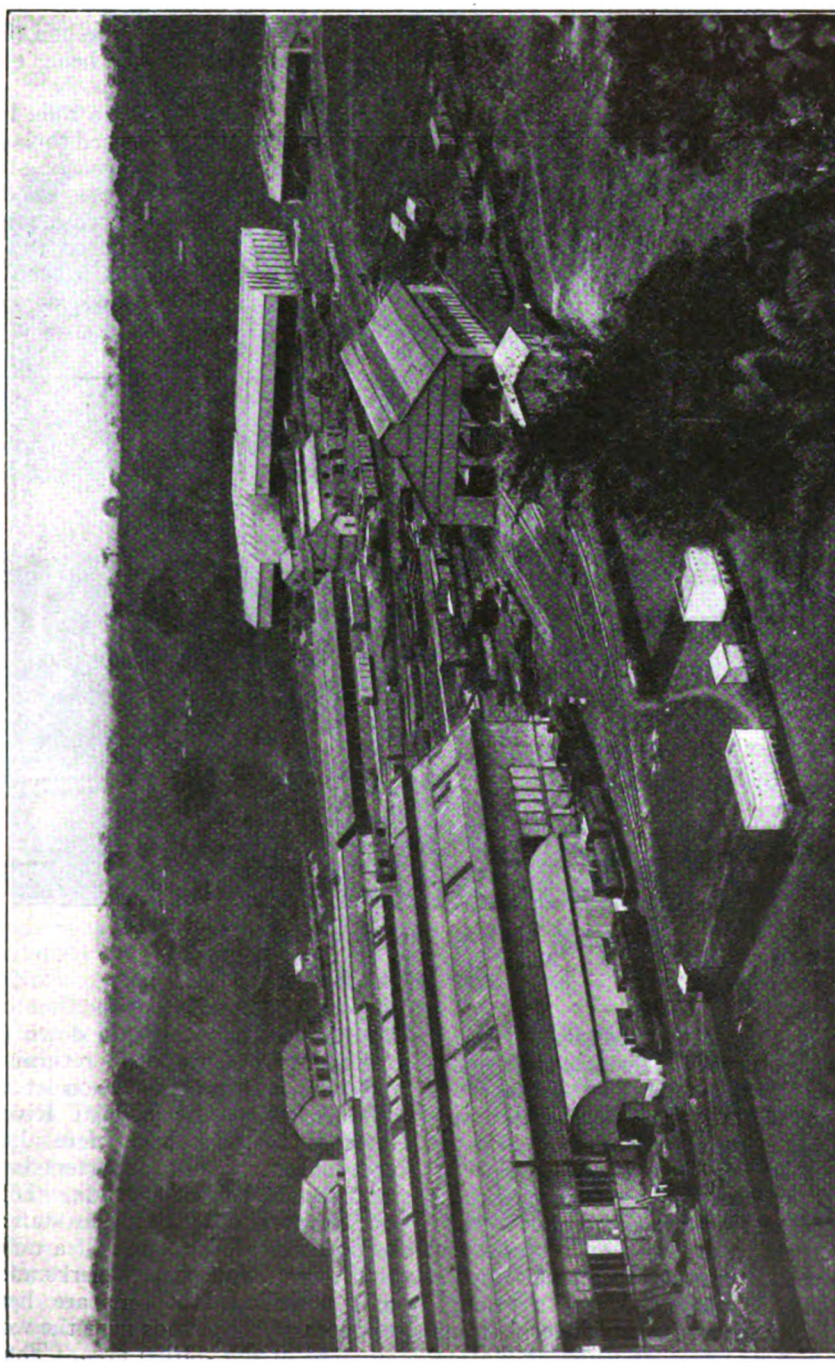

LOCOMOTIVE CARRIAGE AND WAGON SHOPS AT SEKONDI.

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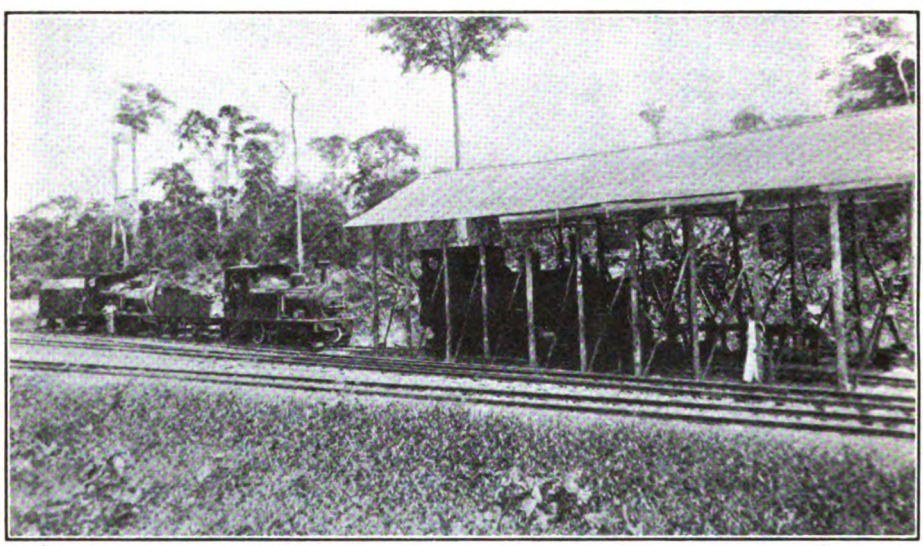
Watering facilities are provided. Half a mile east of the station, extra sidings are provided on the river slip-way of the West African Mahogany Company. Log rafts are formed on the upper reaches of the Prah River, and are hauled ashore at this point by steam winches, and after loading are carried to the coast by train.

The line now enters the wide, shallow Ongwa Valley, and rising and falling on easy grades, crosses the Ongwa River by a double 40-ft. deck span, reaching the station of the same name at mile 40. A single passing loop only is provided here.

staff quarters being built on newly-cleared rising ground half a mile to the east.

Between Fosu and mile 57, where local summit level is reached, the line climbs by long grades, the last mile being especially severe at 1 in 80.

Another deep cut, half a mile long and 47 ft. in depth, is here passed through. At Akenkawsu, mile 60½, two passing loops are provided, but little traffic is expected for some years, the place serving principally as an electric staff station on the 17-mile section east of Fosu. The River Akenkaw is crossed by a 20-ft. deck span soon after leaving the station. A stiff climb for



**TEMPORARY LOCOMOTIVE SHOP AT APRADI.**

Locomotives "Kape" and "Oda" outside, "Foss" inside.

Leaving Ongwa, the country rises for 17 miles, the first 10 of which are by easy grades to Fosu, the first large town served by the railway. The station is half a mile south of the town, but is situated on the north road from Cape Coast Castle. In addition to the usual goods and passenger stations, extensive sidings are built to serve sites let out by the railway to stores and commercial firms as their local depots. South of the passing loops, a triangle allows locomotive turning for local trains. Fosu is the first regular watering station. Permanent European quarters are provided for a district stationmaster and assistant engineer, the bungalows with garages and

2¼ miles is followed by a down grade as the line turns due north, returning to its old east and west direction at mile 66. After crossing the Cherati River on a 60-ft. deck span on concrete abutments, the construction headquarters is reached at the station of Apradi. Temporary bush houses for the European staff are built on a cleared hill about half a mile to the south-west, while native clerks and skilled and unskilled labourers are housed in temporary compounds near the workshops situated in the station area. The permanent station comprises the usual passenger and goods platforms.

*(To be continued.)*

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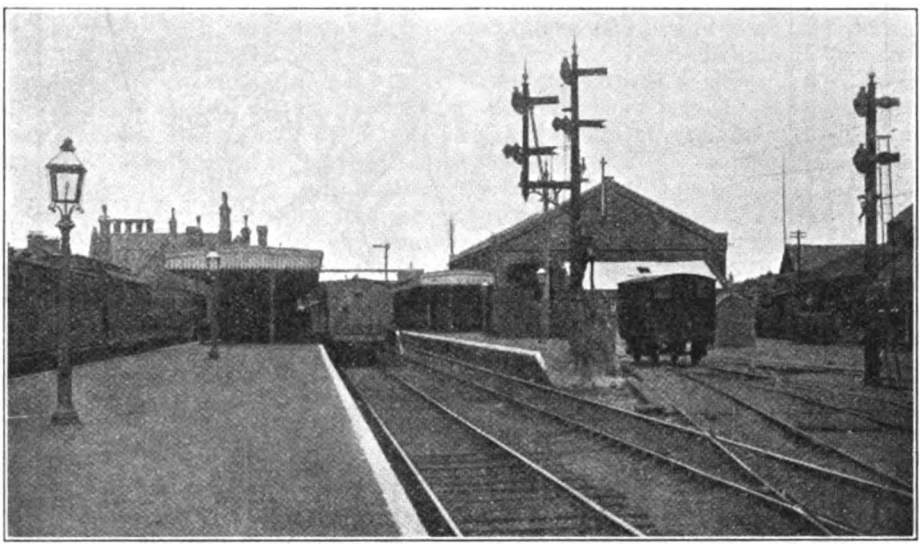

DEREHAM STATION.

# The Norfolk Lines of the London and North Eastern Railway. [No. II.]

*(Photographs by the Author.)*

By J. F. GAIRNS, M.Inst.T., M.I.Loco.E.

IN the first section of this article historical aspects were covered and general features indicated, reference being made particularly to the influences of waterways in the district, the various swing bridges, the layout in the Norwich district, and the Forncett-Wymondham branch. The map given last month is repeated for convenience of reference.

In that the line from Brandon to Norwich (Victoria) was the first to be built south of the River Yare, it is necessary to consider the connecting line to Trowse as an addition subsequently constructed, leaving the Ipswich line at the Upper Junction and running down to the Brandon line at the Lower Junction, though the effect to-day is that the Ipswich main route to Norwich (Thorpe) runs to Trowse to cross the river by means of a viaduct passing over the Brandon and Cambridge route. For a long period Victoria station was used for certain local services, although not in recent years by expresses. It is now, however, entirely given over to goods traffic. It may also be mentioned that in quite early days a serious head-on collision occurred near the site of the present Whitlingham station, thus influencing the development of safety appliances for single-line control.

At Whitlingham the Cromer line diverges up a fairly steep gradient, proceeding inland until at Wroxham it gives access to the Broads. The Yarmouth line, as already indicated, continues in close company with the Yare.

At Cantley a sugar beet factory was erected some years ago and has been operated with varying success. This has accounted for a considerable volume of traffic, including coal, limestone, sugar, pulp for cattle feeding, &c.

Considering the various sections beyond the junctions mentioned, it will be most convenient to follow the Yarmouth line to its terminus. At Brundall the newer and more direct line to Yarmouth diverges



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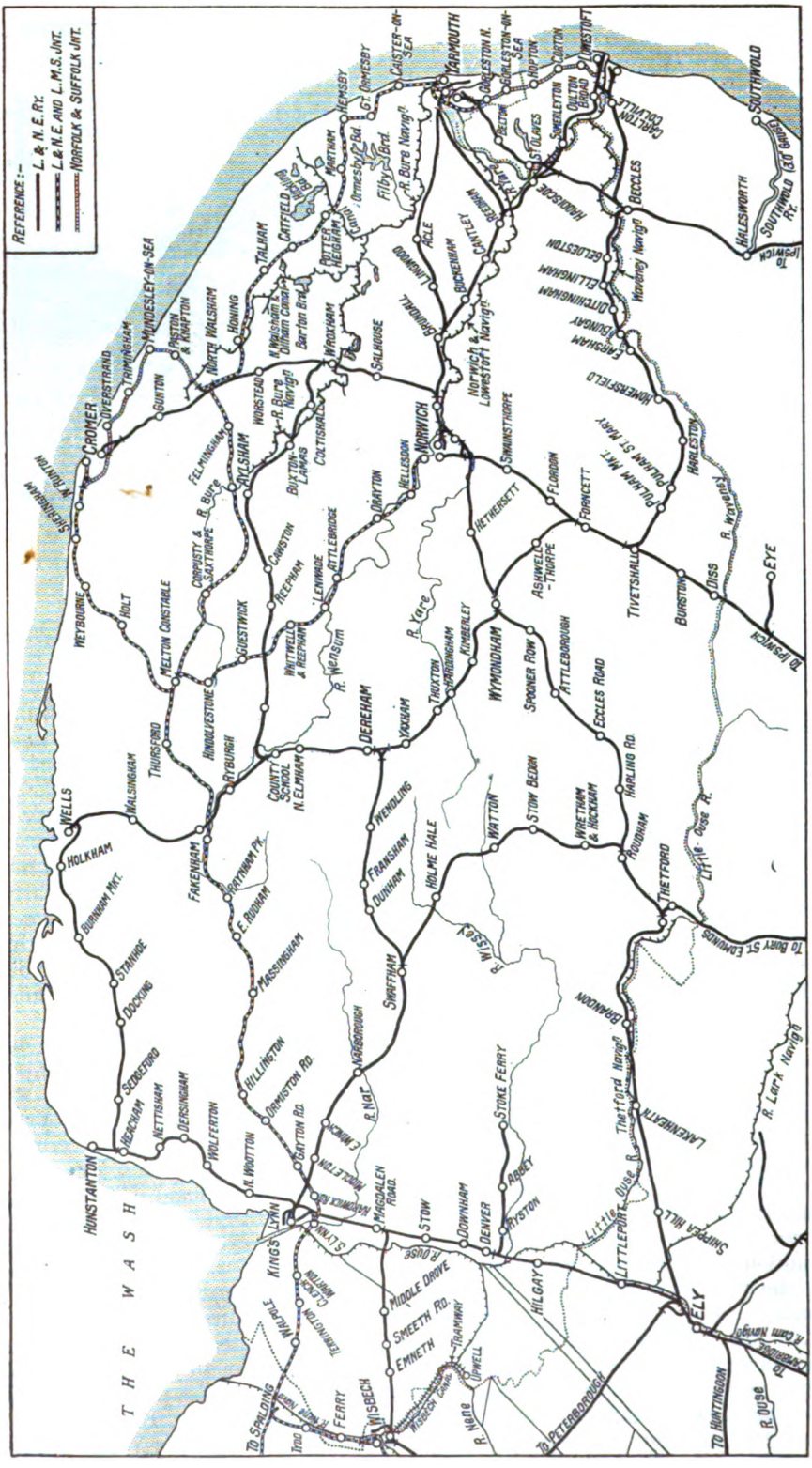


RAILWAY MAP OF NORFOLK, SHOWING ALSO RIVERS, WATERWAYS AND "THE BROADS."

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inland *via* Acle, with one other intermediate station, Lingwood, Acle being, however, the only crossing station on this stretch. The old line is double-track to Reedham, passing Buckenham and Cantley stations. Reedham station itself is quite ordinary in character, but at the eastern end the layout has several interesting features. Here the single line from Yarmouth comes in alongside the double line from Lowestoft, the former joining outside the station. There are also sidings to suit the combining and separating of trains, which here occurs several times a day, a train from one route coming into the station and then backing out to allow the engine to be detached, and the train from the other route, which follows closely, to enter the station and then back on to the section to be attached. Similarly, on the down side, an engine takes away the section left by the main train. Usually the Lowestoft sections are attached or detached here, though, in view of the fact that some of the Yarmouth-Norwich traffic is worked *via* Acle, certain Lowestoft trains run through to and from Norwich, and in some instances there are through trains on each route, a few minutes apart, between Norwich and Reedham.

Where stations are omitted between Norwich and Reedham, a previous train provides a fairly close pick-up service, while by giving the Lowestoft trains the non-stop run the journey to or from Norwich is covered in from 44-50 minutes as compared with 41-50 minutes to Yarmouth *via* Acle, though calling at all stations. In the opposite direction there are corresponding arrangements. It is interesting to note, in this connection, that there is a heavy residential traffic between Yarmouth and Lowestoft and Norwich, there being seven trains from Yarmouth to Norwich up to 9.34 a.m. (including the latter), two of these, 7.42 and the 9.34 a.m. itself, stopping only two or three times, while Lowestoft has four services during the same time. Altogether Yarmouth has about 20, and Lowestoft some 14 trains during the day, together with some which run on certain days only. Several of these include through carriages from or to beyond Norwich, and certain trains have restaurant cars, in that they constitute through expresses between Lowestoft and York, and in one case to and from Liverpool and Manchester. Near Brundall station is Brundall Gardens Halt.

There is not much else calling for special comment on the old Yarmouth line. There is one intermediate station, Berney Arms, between Reedham and Yarmouth, at which calls are made as required. At Breydon Junction, alongside Breydon Water, the Reedham and Acle single lines join, and the line is then double to Vauxhall station, with sidings, goods station, engine shed, &c., approaching the terminus. Before reaching Vauxhall station, the Midland & Great Northern line round from Yarmouth (Beach) station crosses, and a good view is had of the well-known viaduct of that line across Breydon Water. Although constructed in connection with the Norfolk & Suffolk Joint Committee's line to Lowestoft *via* Gorleston, the connection from Yarmouth (Beach) and across the Breydon Viaduct is solely M. & G.N. Joint. The L.N.E.R. reaches the Joint Committee's line from South Town station, on the other side of the River Yare, and, therefore, in Suffolk.

Adjacent to Vauxhall station the goods yard is connected by a "tramway" through riverside thoroughfares of Yarmouth to reach the wharves along the river bank. There is also a connection with these tracks from the M. & G.N. Joint Railway, the only communication between the two railways on the north side of the Yare, but traffic is handed over to the London & North Eastern Railway before passing on to the roadway tracks. Wagons passing through the public streets and to the river wharves are worked by special L.N.E. locomotives of tramway type enclosed, and equipped with cow-catchers, warning bells, &c., and preceded by a man carrying a red flag. M. & G.N. traffic is handed over or received at White Swan Yard, near Vauxhall station.

Returning to Reedham, the junction for the Lowestoft line, the branch crosses the river by a bridge having a swing span, electrically operated. It then curves round to follow closely the banks of Haddiscoe Cut, forming part of the Norwich and Lowestoft Navigation (acquired by the G.E.R. when it took over Lowestoft Harbour, so that the L.N.E.R. is responsible for its upkeep). This connects the Yare and the Waveney. This is an abso-

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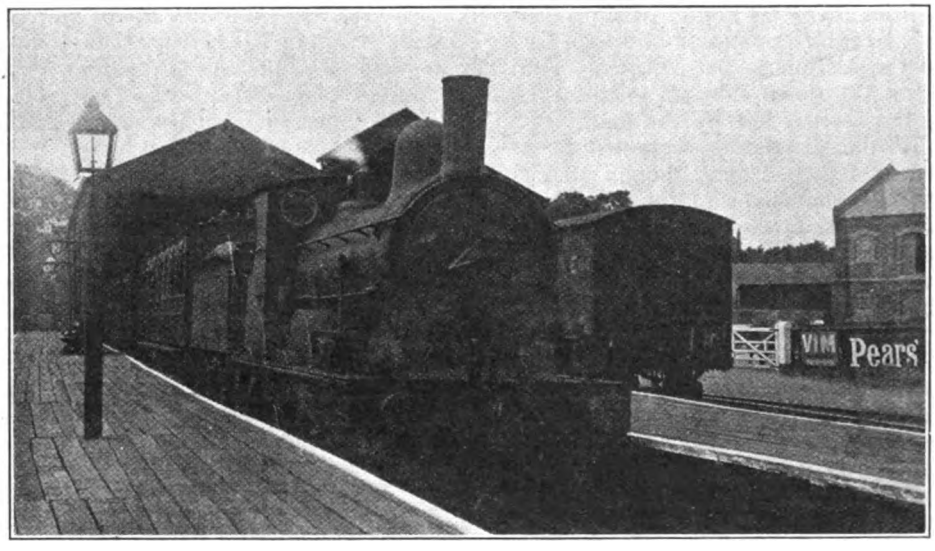
lutely straight stretch of waterway, known as Haddiscoe Cut, fairly wide, and of considerable value for local water traffic, and largely used by sailing and rowing boats, launches, &c., many of which can usually be seen as the section is traversed by train. At Haddiscoe the railway lay-out is somewhat complex. The main line from Beccles to Yarmouth (South Town) is on the higher level, with the Reedham–Lowestoft station below, almost at right angles, with stairways connecting. South of the high-level station is Fleet Junction, a single-line curve (now used only for goods traffic) leading thence in the Norwich direction to the low-level station, where it has a side platform, though only goods traffic is now worked over this connection. Within the recollection of people still living, carriages from Norwich were detached at the low-level station, and hauled by a horse *via* Fleet Junction for attaching to a train on the high-level line.

North of the upper level station there is a single line spur connecting with the low-level line towards Lowestoft. This spur is sharply curved, as it leads directly from the St. Olave's swing bridge over the Waveney. Local trains run between Yarmouth and Lowestoft *via* this spur, but although they pass so close to Haddiscoe station they cannot serve it, no platform being provided. The important station for the district is St. Olave's, on the other side of the river. The old bridge was single-line and, like that at Beccles was protected by fixed danger signals, trains being conducted across at walking pace by a pilotman who had himself to travel with every train. The existence of these two bridges was largely responsible for the liberal time allowance necessary for express trains between Beccles and Yarmouth. The new electrically-operated bridges now in use have materially improved the situation.

There is no need to consider other lines in this district in detail, as they pass into Suffolk. The Waveney Valley line from Beccles to Tivetshall, too, may be shortly referred to. It curves sharply away from Beccles, and is single-track, Bungay and Harleston being the intermediate crossing stations. At Pulham Market there is a siding connecting the Naval Air Depot so well known during the war. At Tivetshall there is an island platform on the up side, the outer face of which is used by branch trains in both directions. Up trains run past the main line platform and then back to the other side to reach the branch. Most of the trains work through to Norwich, so that there is little continued occupation of the side platform.

Dealing now with the Cromer group of lines, after leaving the Norwich–Yarmouth




WELLS STATION.

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route severe gradients are frequently encountered all the way to Cromer. Wroxham is the centre on this line for the Broads district, one of the great attractions of Norfolk. Just before entering the station from the south the River Bure is crossed, and this and the by-waters adjacent are usually crowded with small craft, while boat-houses and yacht constructing and repairing establishments indicate the importance of this traffic. From the point of view of the holiday-maker this area is the finest part of the county. The coast road from Bacton and Happisburgh to Cley and Blakeney passes through charming country which commences at Bacton at about sea-level; at Mundesley the cliffs are a fair height, and there is a gradual rise to Trimingham (Beacon Hill), 300 to 400 ft. above sea-level; thence one passes through Sidestrand (the "Garden of Sleep" made famous by Clement Scott's "Poppyland Papers") and continues on the high ground until beyond Cromer; then the road begins to drop, coming again to sea-level at Salthouse, continuing alongside the flats to Cley and Blakeney, two quaint old-world places, the latter at one time a port of considerable importance. Not only is there coast scenery, but a belt of charming country behind the road described.

North of the station at Wroxham the Aylsham line diverges on the down side, the main line continuing through Worstead to North Walsham. Since the construction of the Mundesley line North Walsham has become an important traffic centre, and, because of its junction character, has constituted the termination of the non-stop run from London given to certain summer expresses, which would otherwise be non-stop to and from Cromer during the height of the holiday season. Before reaching the station the Midland and Great Northern Joint line from Yarmouth is paralleled for some distance, the respective stations being adjacent. North of the L.N.E.R. station the main section of the Midland and Great Northern Joint line passes under the London and North Eastern line on its way towards Melton Constable. From both stations there are branches which join at Antingham Road Junction, the continuation of the route to Mundesley-on-Sea and thence *via* Trimingham and Overstrand to Cromer (Beach), *via* Newstead Road Junction, being operated by the Norfolk and Suffolk Joint Committee. North Walsham London and North Eastern station is of ordinary type, except that on the up side there is a loading dock adjacent to the goods yard. In many cases through carriages are worked from London to Mundesley-on-Sea, &c., on the Joint line.

The main line continues from North Walsham direct to Cromer, but is single-track between North Walsham Junction and Cromer Junction, controlled by electric train tablet, the intermediate station (Gunton) being a crossing and tablet station. Cromer Junction is a short distance south of the terminus, and usually down trains having vehicles for Sheringham are stopped at the junction for these to be detached, the main train continuing into the terminus.

Most of the Norwich–Cromer line is through picturesque and somewhat hilly country, and approaching Cromer fine views are had over the cliffs of "Poppyland." The station is well equipped, having refreshment-room and other accommodation, beside the usual station offices, though it suffers somewhat from the fact that it is located on high ground, so that to reach it from the town involves a rather severe ascent. Between Cromer Junction and the station the joint line from Mundesley passes underneath, trains or through carriages from the main line traversing a short curve to join it at Roughton Road Junction. Thence the joint line continues through very pretty country to Newstead Lane Junction, where a curve to the right enables Midland and Great Northern Joint trains to reach Cromer (Beach) station, while at Runton West Junction joint trains pass on to the Midland and Great Northern Joint Railway, exercising running powers through West Runton to Sheringham. The latter station, serving a resort which has in recent years become a serious rival to Cromer, and which has many interesting characteristics of its own, is a somewhat picturesque erection, there being on one side a wide platform having a side bay where L.N.E. through carriages are often placed after arrival to allow luggage, &c., to be unloaded more or less at leisure.

The Joint line from North Walsham is

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single-track between Antingham Road Junction and Newstead Lane Junction, controlled by electric train tablet. The first station, Paston and Knapton, is non-crossing, but Mundesley, besides being distinctive for its station buildings, has a wide island platform on the one side and a long main line platform, with a bay for part of its length, on the other. There are also sidings and goods yard adjacent. Although Mundesley is the principal station on this section, and has become a favourite holiday resort, Trimingham and Overstrand are also important from the same point of view, and through carriages from London usually work as far as Overstrand. This station, as also Trimingham, is served by an island platform. Local Midland and Great Northern Joint Railway trains usually work the through services, which, with one exception, all run into Cromer (Beach) station. It is interesting to note that for some time past local services on this line have been worked on the conductor-guard system, as arranged by Mr. Marriott, late Engineer and Traffic Manager of the Midland and Great Northern Joint Railway, the only intermediate station at which tickets are now issued from the booking offices being Mundesley, where, also, the goods traffic of other stations on the route is dealt with.

## NEW DOCK-SHUNTING 0-6-0 TANK ENGINE, L.M.S.R.

By the courtesy of Sir Henry Fowler, K.B.E., Chief Mechanical Engineer, London Midland & Scottish Railway, we are enabled to reproduce a photograph showing one of a new series of ten 0-6-0-type dock shunting tank engines which have been built at the Derby Works. These are numbered 11270–11279. The engines are of an entirely new class designed to meet the special requirements of dock and goods yard shunting, where curves of very small radius are frequently met with.

The diameter of the wheels is 3 ft. 11 in. and the total fixed wheelbase only 9 ft. 6 in. This short wheelbase, together with the provision of Cartazzi type trailing axleboxes and ball-jointed coupling rods, will enable the engines to negotiate curves of as small as 2½ chains (165 ft.) radius.

The engines are fitted with outside cylinders driving the middle pair of wheels, Walschaert's gearing being used for actuating slide valves operating above the cylinders. It has been possible to embody a standard type of boiler working at 160 lb. per sq. in., and all standard fittings, such as Ross "pop" safety valves, water gauges, &c., have been used.

The boiler is of the non-superheater type and has a total heating surface of 1,088 sq. ft., of which 923 sq. ft. are in the tubes and 85 sq. ft. in the firebox. The grate area is 14·5 sq. ft. The cylinders measure 17 in. diam. by 22 in. stroke, other dimensions being on a corresponding scale.

The tanks have a water capacity of 1,000 gallons, and the bunker accommodates 30 cwt. of coal. The weight of the engine in working order is 43 tons 12 cwt. Although the engines are of a small type, a high tractive effort, namely, 18,400 lb. has been provided in order to deal with the heavy work at the docks. The engines are of neat appearance, and all parts are readily accessible. Steam sanding gear is applied at each end, thus being available for use when running in either direction.

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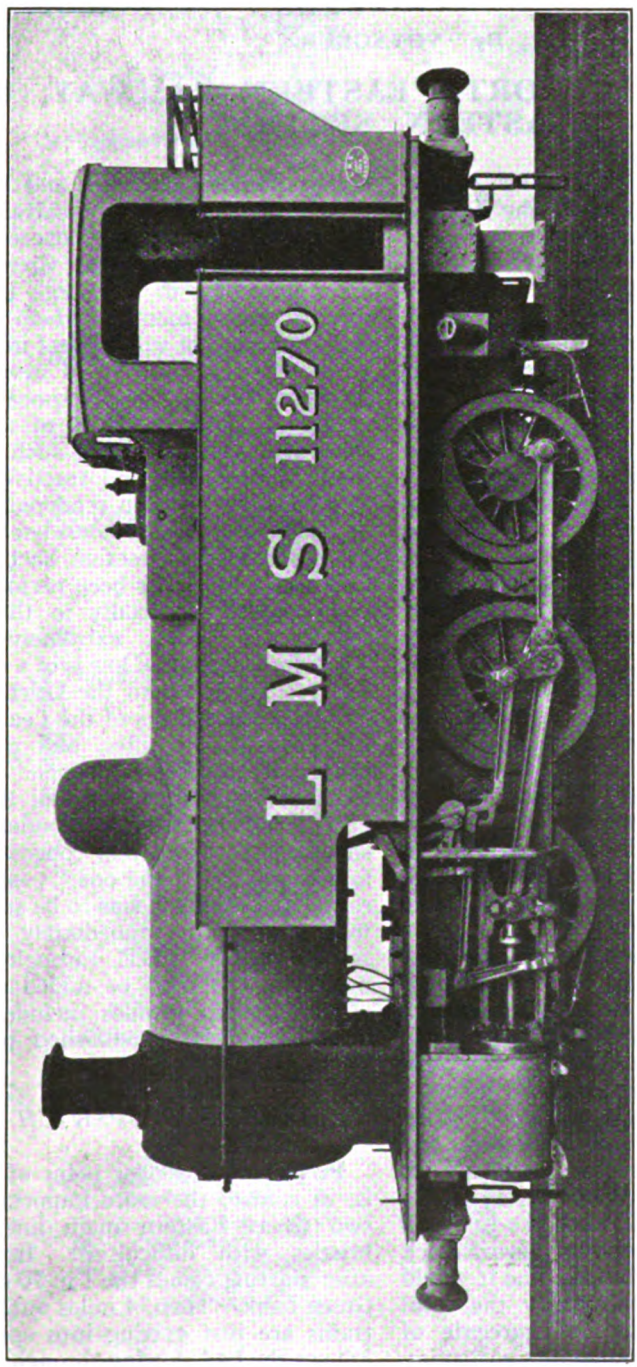


**NEW 0-6-0 TYPE TANK LOCOMOTIVE, LONDON MIDLAND & SCOTTISH RAILWAY.**

Designed by Sir Henry Fowler, K.B.E., and built at Derby Works.

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# The Main Line Gradients of British Railways.

By "VOYAGEUR."

## III.—LONDON & NORTH EASTERN RAILWAY, GREAT EASTERN SECTION.

IT seems somewhat singular to find within the confines of the Eastern Counties lines with such severity of grading as those of the pre-grouping Great Eastern Railway. For this phenomenon certain reasons may be advanced. Any main line skirting the coast, even in moderately hilly country, suffers by having to cross a succession of valleys bringing the rivers down to the sea. The Colchester main line of the Great Eastern exhibits this characteristic in a marked degree, especially in the depressions which have to be crossed at Colchester, Manningtree and Ipswich, and, on the East Suffolk line from Ipswich to Yarmouth, still more markedly at Woodbridge, Snape Junction, Halesworth and Beccles. Such difficulties of grading may be mitigated if costly earthworks and engineering works are undertaken with a view to smoothing out the route; but the lines in the Eastern Counties, constructed to give railway communication at minimum cost through country which could never be expected to produce a heavy and remunerative railway traffic, are of precisely the opposite character.

As regards engineering works, the masonry viaduct south of Chelmsford Station is the only structure of its kind worth mention, on the Colchester main line, while tunnels are confined to the one short bore between Halifax Junction and Ipswich. When it comes to earthworks, the Ipswich and Yarmouth line appears for the most part to have been laid originally over the surface of the ground, without any earthworks to speak of, and a more extraordinary switchback of steep gradients on a main line it would be difficult to find. Actually the total vertical rise—that is, the aggregate of "lift" up adverse gradients, neglecting the falling gradients—amounts to no less than 1,700 ft. in the 138 miles between Liverpool Street and Cromer and 1,685 ft. between Liverpool Street and Yarmouth, though the highest altitude attained above the sea nowhere greatly exceeds 300 ft. Another difficulty on the Great Eastern main lines lies in the large number of service slacks, many of them severe in character, and of worse effect in that they are situated at the foot of steep inclines, up which the recovery of speed has to be made. It is little short of marvellous that with locomotives of such comparatively limited size and tractive capacity as have hitherto been rendered necessary by track and bridge considerations over the Great Eastern section, such excellent locomotive work has been performed with trains which, especially in the summer season, are often extremely weighty. The Cambridge main line is of a very much easier character than the Colchester line, following the valleys of the Lea and Stort for the first 30 miles, and pursuing a practically dead level course across the Fens between the 50th and 90th milepost; but its exit from London is steep, sharply curved and very congested for the first 5 miles, and the one "peak" of the route, at Elsenham, has to be surmounted from the south immediately after the severe service slack through Bishop's Stortford. It may be added that none of the branch profiles included in this article have been published previously.

### (1) *LIVERPOOL STREET TO NORWICH, VIA IPSWICH* (Sheets 9 and 10).

From the passenger point of view this is, of course, the more important of the two Great Eastern main lines, but it bristles with difficulties. Immediately after starting comes the 1 in 70 of Bethnal Green bank. Then, 4 miles out, when the trains are just getting into speed, there follows the bad slowing through Stratford. Recovery from here has to be made up gradually rising grades, suddenly steepening at Harold Wood to the well-known



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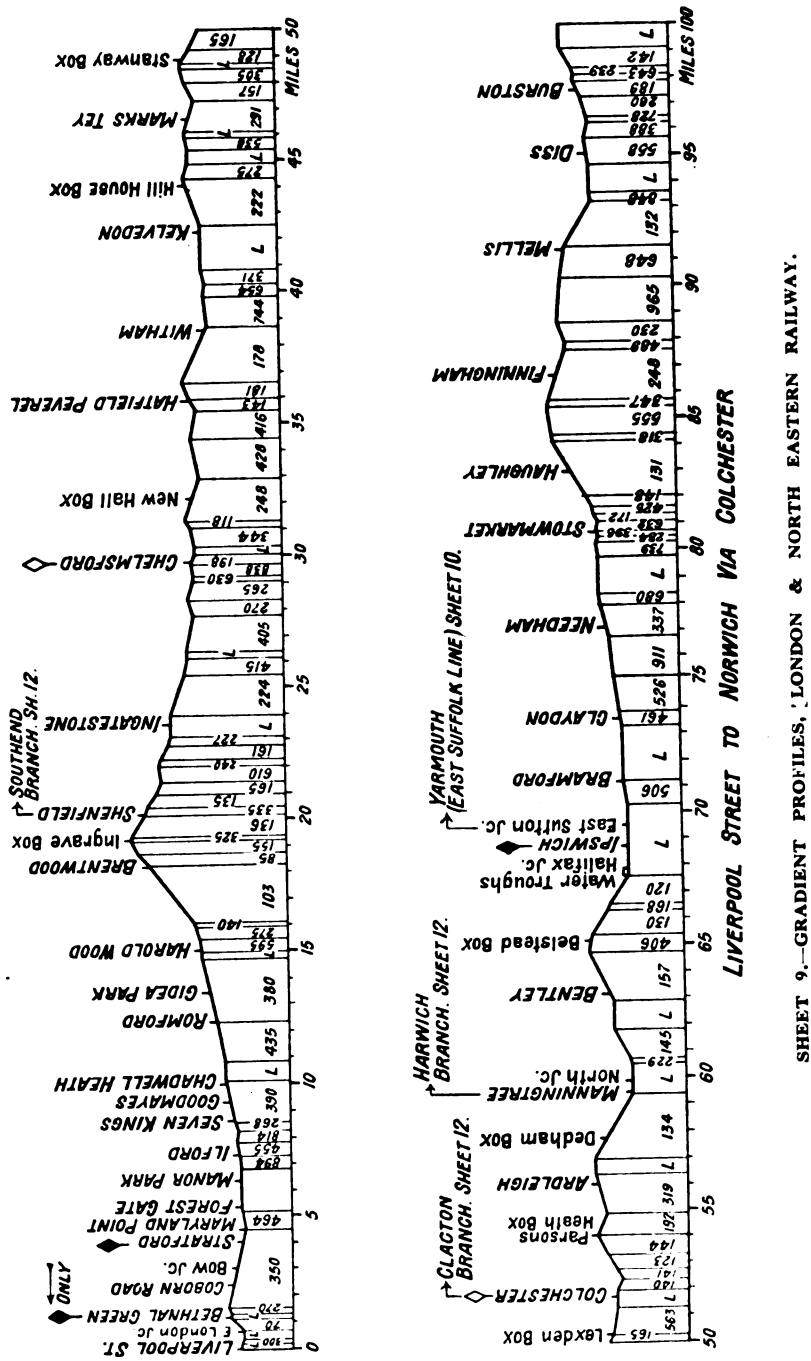


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Brentwood Bank, of which the steepest pitch is at 1 in 84, though the average inclination is not more than 1 in 100 for the 3½ miles of its length. The convergence of four tracks to two from Romford Junction onwards also occasions considerable congestion over this section, especially until the divergence of the Southend line at Shenfield, but this has now been somewhat relieved by the provision of automatic signalling from Harold Wood up to Brentwood. Once clear of Shenfield, down trains have a good run on to Colchester, with one or two fairly steep pitches, such as the descents on the down road into Witham and Colchester, but in each case short. So greatly has the alignment of the road through Chelmsford been improved that the slack there is now purely nominal, but that at Colchester is a little more severe.

Between Colchester and Ipswich the chief obstacle is the wide valley of the Stour, the descent to which on the south side is for 2½ miles at 1 in 134; but the 4-mile ascent on the other side is broken by the mile of level near Bentley. Fortunately this "dip" may be taken at full speed. Then follows the drop to the Orwell valley—for 2¼ miles at an average of 1 in 125—which makes a difficult start for heavy trains starting south from Ipswich. From Ipswich northwards the valley of the Gipping provides an easy course for 12 miles, to Stowmarket, but then comes the ascent of Haughley bank, to the summit at mile-post 85½, which should be noted by timers. Once over the summit, down expresses have some excellent travelling for 12 miles, to beyond Diss, followed by sharp switchback grades until the divergence from the old Norwich (Victoria) line at Trowse Upper Junction, where speed must be severely reduced, and kept at a low figure round the curves from there into Norwich Thorpe Station.

### (2) *SHENFIELD TO SOUTHEND-ON-SEA* (Sheet 12).

It is only during the last two decades, since the late Midland Railway absorbed the old London, Tilbury and Southend line in 1912, that the Great Eastern Southend branch, by way of competition, has sprung to the dignity of an express route. High speeds are, in fact, run over it, despite the severity of its 1 in 100 ruling grade, of which Ramsden Bellhouse bank alone provides 3½ miles continuously adverse to up trains. Roughly two-thirds of the branch are inclined at 1 in 100, and yet the fastest daily booking of the Great Eastern section—20·7 miles from Shenfield to Prittlewell in 24 min., average 51·8 m.p.h.—is achieved over it.

### (3) *COLCHESTER TO CLACTON-ON-SEA* (Sheet 12).

This branch, over which there works nightly the 5.30 p.m. express from Liverpool Street, with its non-stop run to Thorpe-le-Soken, also has some difficult grades. There is a good downhill start out of Colchester, but the momentum of this is lost by the slack through Wyvenhoe, just when it is most needed for the nasty 1 in 80 ascent which follows. The sharp subsequent ups-and-downs are mostly short, but a final hindrance is the single-line section from Thorpe to Clacton, entailing severe slacks at Thorpe (in the case of any train which, like the Sunday "Clacton Pullman," does not stop there), and at Great Holland, for tablet purposes.

### (4) *MANNINGTREE TO HARWICH* (Sheet 12).

The great importance of this short branch lies in the fact that it is used by the boat express trains between Liverpool Street and Parkeston Quay. The descent of Dedham Bank to Manningtree must be rudely cut short by the very severe slowing over Manningtree South Junction, followed by recovery up a short but steep pitch to Mistley. There is a substantial dip between Mistley and Wrabness before the final descent to Parkeston. Up trains, however, are faced with the worse task of the two, owing to the lengthy climb out of Parkeston, and then the full length of Dedham bank to negotiate after the drastic Manningtree slowing, and it is partly for this reason that their timings are slower than those of the down service.

### (5) *IPSWICH TO YARMOUTH (SOUTH TOWN) AND LOWESTOFT* (Sheets 10 & 12).

With any substantial load this route is a stiff proposition indeed, and from Ipswich northwards the grades become

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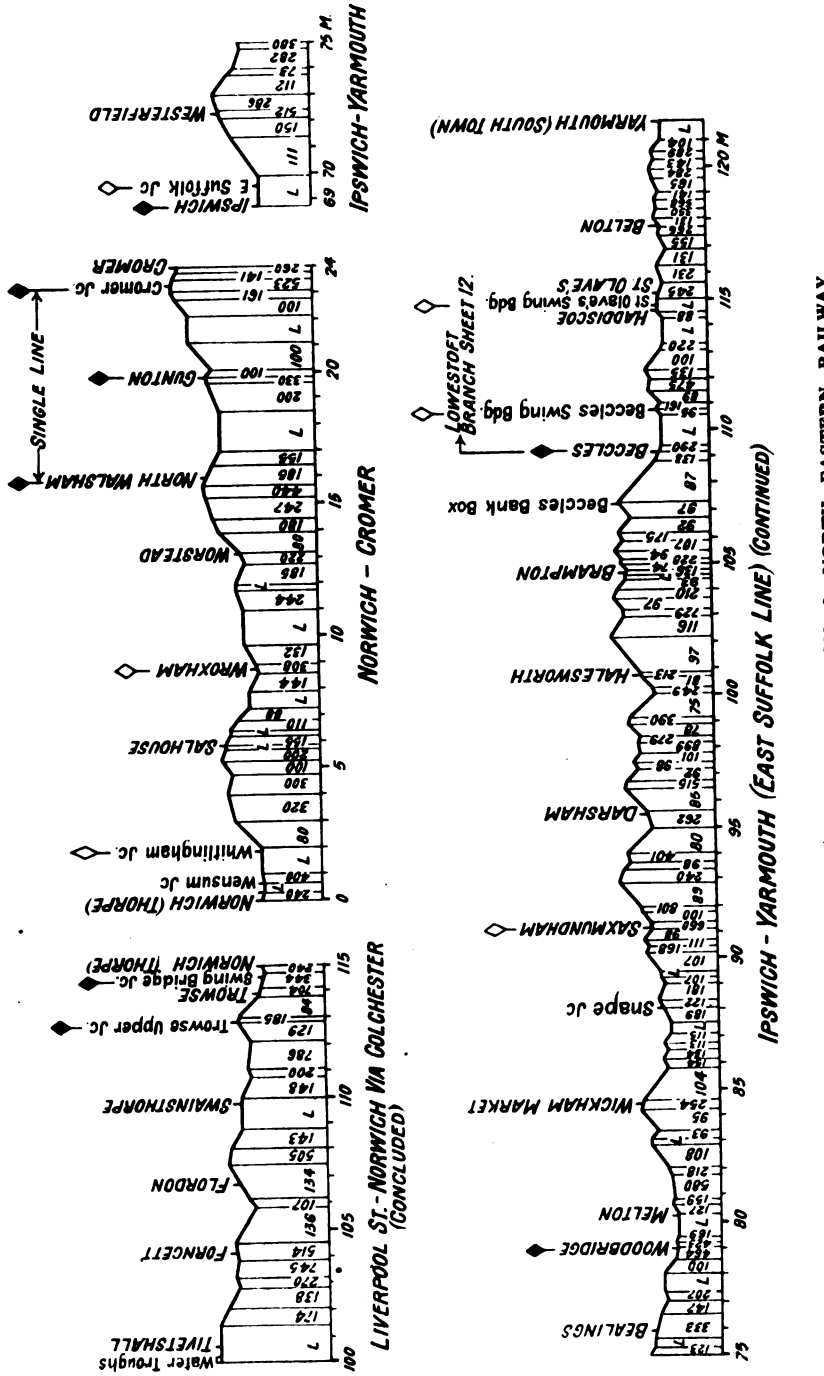


SHEET 10.—GRADIENT PROFILES, LONDON & NORTH EASTERN RAILWAY.

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progressively steeper until they reach their maximum inclination between Saxmundham and Beccles. Each one of the three service slacks—Woodbridge, Saxmundham, and Beccles—is at the foot of falling grades from both directions; the middle one of the three is not severe, but the other two are, and the recovery for non-stop up trains from Beccles, or the start of trains which have called there, is exceedingly difficult, up the 1 in 87 to Beccles Bank Box. Fortunately the two worst obstacles on the route—the swingbridges at Beccles and St. Olaves—which once entailed speed reductions to 3 m.p.h. in each case, to enable the bridge pilotman to mount the engine footplate—have now been replaced by modern double-line structures, with no limitation of speed; this improvement has curtailed running times between Beccles and Yarmouth by 4 to 6 min. per train. Little need be said about the Lowestoft branch; it is practically level throughout, the only handicap being the slow running over the curves and swingbridge between Carlton Colville and Lowestoft.

### (6) *NORWICH TO CROMER* (Sheet 10).

The Cromer branch has some very heavy grades, and is the only one of the Great Eastern coast branches to terminate at a very much higher level than London. Before the non-stop expresses, which miss Norwich by the Wensum Curve—from Swing Bridge Junction at Trowse to Wensum Junction—have attained any speed from the Wensum slowing, they are faced by the 1 in 80 of the rise from Whitlingham Junction, and there are also steep ascents from Wroxham, Worstead and Gunton. Up trains have the better of the branch, their worst task being the climb to Salhouse after slacking through Wroxham.

### (7) *LIVERPOOL STREET TO NORWICH, VIA CAMBRIDGE* (Sheets 11 & 12).

The Cambridge main line is in striking contrast to the routes already described, and requires but brief description. The difficulties between Liverpool Street and Tottenham have already been mentioned; they make it necessary to allow express trains 13 min. down and 13 to 15 min. up over this 6-mile stretch. Beyond the fairly sharp reverse curvature in the Stort Valley, between Bishop's Stortford and Roydon, up trains have as far as Tottenham one of the best stretches on the Great Eastern section for fast running; down expresses have the "collar-work" of a continuous rise against the engine. At present all down trains call at Bishop's Stortford, after which they have the climb to Elsenham, only steep in its final 1½ miles; but the 13-mile rise from Whittlesford to the same point, broken only by the brief 1½-mile drop from Audley End to Newport, is a much harder proposition for heavy up expresses. Beyond Whittlesford, as previously mentioned, there is no appreciable grade for 40 miles; the next 30 miles beyond that consist of moderate ups-and-downs, long in some cases but not steep, until the drop from Kettering-ham Box past Hethersett, with its 2½ miles at 1 in 101-129. The Cambridge main line is the chief freight route of the Great Eastern section, over which there flows a heavy traffic in coal and merchandise from the North and Midlands to the East of London and the Docks, and its fairly easy grading in no small degree facilitates the working over it of substantial loads.

#### DISTANCES

**Liverpool Street to Norwich (Thorpe), via Ipswich (Sheet 9).**

*Mile-posts, down side, from Liverpool Street (zero) to Norwich.*

| | Miles. |
|---|---|
| LIVERPOOL STREET .. .. | 0·0 |
| Bethnal Green Junction .. .. | 1·1 |
| Coborn Road .. .. .. .. | 2·4 |
| *Bow Junction (up)* .. .. .. | 3·0 |
| STRATFORD .. .. .. .. | 4·0 |
| Maryland Point .. .. .. .. | 4·5 |
| Forest Gate .. .. .. .. | 5·3 |
| Manor Park .. .. .. .. | 6·2 |
| Ilford .. .. .. .. .. | 7·3 |
| Seven Kings .. .. .. .. | 8 6 |
| Goodmaves .. .. .. .. | 9·3 |
| Chadwell Heath .. .. .. .. | 10·0 |
| Romford .. .. .. .. .. | 12·4 |
| Gidea Park .. .. .. .. | 13·5 |
| Harold Wood .. .. .. .. | 15·0 |
| Brentwood .. .. .. .. | 18·2 |
| *Ingrave Summit (up)* .. .. .. | 19·3 |
| SHENFIELD AND HUTTON (South-end Branch, Sheet 12) .. .. | 20·2 |
| Ingatestone .. .. .. .. | 23·6 |
| *Crompton's Siding (up)* .. .. .. | 28·9 |

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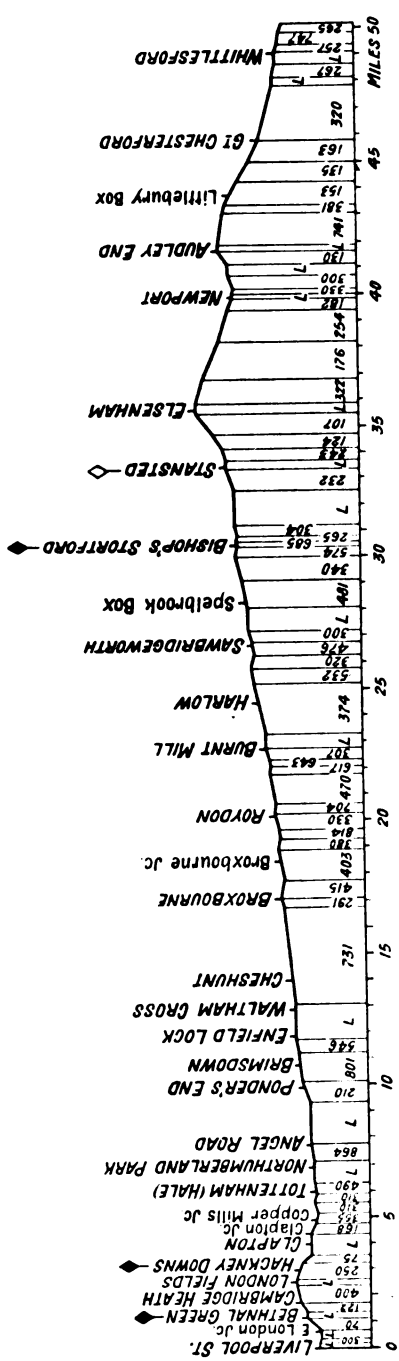


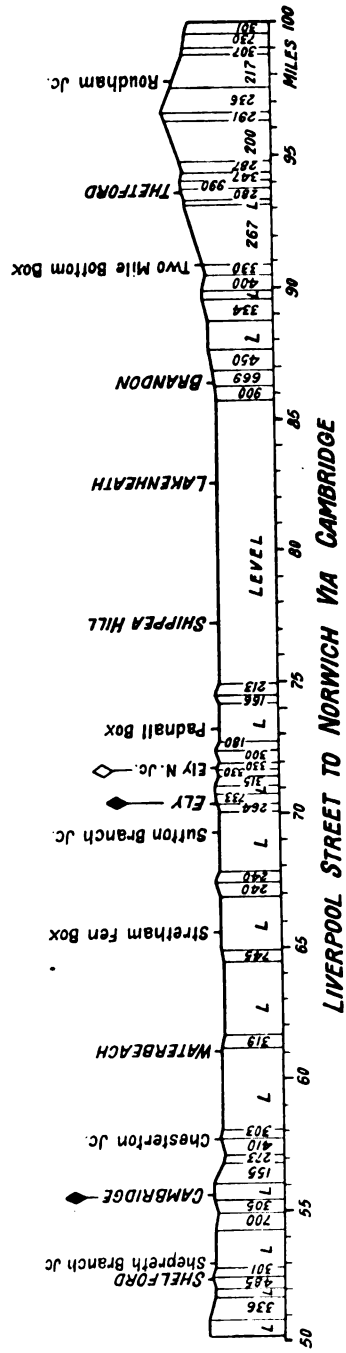


LIVERPOOL STREET TO NORWICH VIA CAMBRIDGE

SHEET 11.—GRADIENT PROFILES, LONDON & NORTH EASTERN RAILWAY.

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| | Miles. |
|---|---|
| CHELMSFORD | 29·7 |
| *New Hall (down)* | 32·1 |
| Hatfield Peverel | 35·9 |
| WITHAM | 38·6 |
| Kelvedon | 42·2 |
| *Hill House (down)* | 44·1 |
| Mark's Tey | 46·6 |
| *Stanway (down)* | 49·0 |
| COLCHESTER (Clacton Branch, Sheet 12) | 51·7 |
| *Parsons Heath (up)* | 54·1 |
| Ardleigh | 56·0 |
| *Dedham (down)* | 57·8 |
| MANNINGTREE (Harwich Branch, Sheet 12) | 59·5 |
| *Manningtree North (down)* | 59·9 |
| Bentley | 63·2 |
| *Belstead (down)* | 65·2 |
| *Halifax Junction (down)* | 68·0 |
| IPSWICH (Yarmouth Main Line, Sheet 10) | 68·7 |
| *East Suffolk Junction (down)* | 69·6 |
| Bramford | 71·2 |
| Claydon | 73·6 |
| Needham | 77·1 |
| STOWMARKET | 80·6 |
| Haughley | 82·9 |
| Finningham | 86·6 |
| Mellis | 91·4 |
| DISS | 95·0 |
| Burston | 97·5 |
| Tivetshall | 100·5 |
| Forncett | 104·1 |
| Flordon | 106·7 |
| Swainsthorpe | 109·7 |
| *Trowse Upper Junction (down)* | 112·9 |
| Trowse | 114·0 |
| *Swing Bridge Junction (up)* | 114·4 |
| NORWICH THORPE (Cromer Branch, Sheet 10) | 115·0 |

### Shenfield to Southend-on-Sea (Sheet 12).

*Mile-posts, down side, Liverpool Street (zero) to Southend.*

| | Miles. |
|---|---|
| SHENFIELD AND HUTTON | 0·0 |
| *Mountnessing (down)* | 1·4 |
| Billericay | 4·2 |
| *Ramsden Bellhouse (up)* | 7·0 |
| WICKFORD | 8·8 |
| Rayleigh | 12·9 |
| Hockley | 16·0 |
| Rochford | 18·5 |
| Prittlewell | 20·7 |
| SOUTHEND-ON-SEA | 21·3 |

### Colchester to Clacton-on-Sea (Sheet 12).

*Mile-posts, down side, Liverpool Street (zero) to Clacton.*

| | Miles. |
|---|---|
| COLCHESTER | 0·0 |
| Hythe | 2·1 |
| Wyvenhoe | 4·5 |
| Alresford | 6·2 |
| Thorington | 8·0 |
| Great Bentley | 9·3 |
| Weeley | 11·4 |
| THORPE-LE-SOKEN | 13·5 |
| *Great Holland (down)* | 15·8 |
| CLACTON-ON-SEA | 18·2 |

### Manningtree to Harwich (Sheet 12).

*Mile-posts, down side, Liverpool Street (zero) to Harwich.*

| | Miles. |
|---|---|
| MANNINGTREE | 0·0 |
| *Manningtree North Junction* | 0·0 |
| Mistley | 1·7 |
| Bradfield | 3·1 |
| Wrabness | 5·6 |
| PARKESTON QUAY | 9·4 |
| Dovercourt Bay | 10·8 |
| HARWICH | 11·3 |

### Ipswich to Yarmouth (South Town) Sheet 12).

*Mile-posts, down side, Liverpool Street (zero) to Yarmouth.*

| | Miles. |
|---|---|
| IPSWICH | 0·0 |
| *East Suffolk Junction (down)* | 0·9 |
| Westerfield | 3·6 |
| Bealings | 7·3 |
| Woodbridge | 10·3 |
| Melton | 11·6 |
| Wickham Market | 15·8 |
| *Snape Junction (up)* | 19·4 |
| SAXMUNDHAM | 22 4 |
| Darsham | 26·7 |
| Halesworth | 32·0 |
| Brampton | 35·9 |
| *Beccles Bank (down)* | 38·5 |
| BECCLES | 40·5 |
| *Beccles Swing Bridge (up)* | 42·0 |
| Aldeby | 43·7 |
| Haddiscoe | 45·9 |
| St. Olave's | 46·5 |
| Belton | 49·0 |
| YARMOUTH (SOUTH TOWN) | 53·1 |

### Beccles to Lowestoft (Sheet 12).

*Mile-posts, down side, Liverpool Street (zero) to Lowestoft.*

| | Miles. |
|---|---|
| BECCLES | 0·0 |
| *Barnby (up)* | 3·5 |
| Carlton Colville | 6·3 |
| LOWESTOFT (CENTRAL) | 8·5 |

### Norwich to Cromer (Sheet 10).

*Mile-posts, down side, Norwich Thorpe (zero) to Cromer.*

| | Miles. | |
|---|---|---|
| NORWICH THORPE | 0·0 | |
| Trowse (from Liverpool Street direct *via* Ipswich and Wensum Curve) | 114·0 | |
| *Swing Bridge Junction (up)* | 114·4 | |
| *Wensum Junction (up)* | 114·8 | 0·7 |
| Whitlingham Junction | 115·9 | 1·8 |
| Salhouse | 120·0 | 5·9 |
| Wroxham | 122·8 | 8·7 |
| Worstead | 127·2 | 13·1 |
| NORTH WALSHAM | 130·1 | 16·0 |
| Gunton | 133·9 | 19·8 |
| *Cromer Junction (down)* | 137·4 | 23·3 |
| CROMER | 138·1 | 24·0 |

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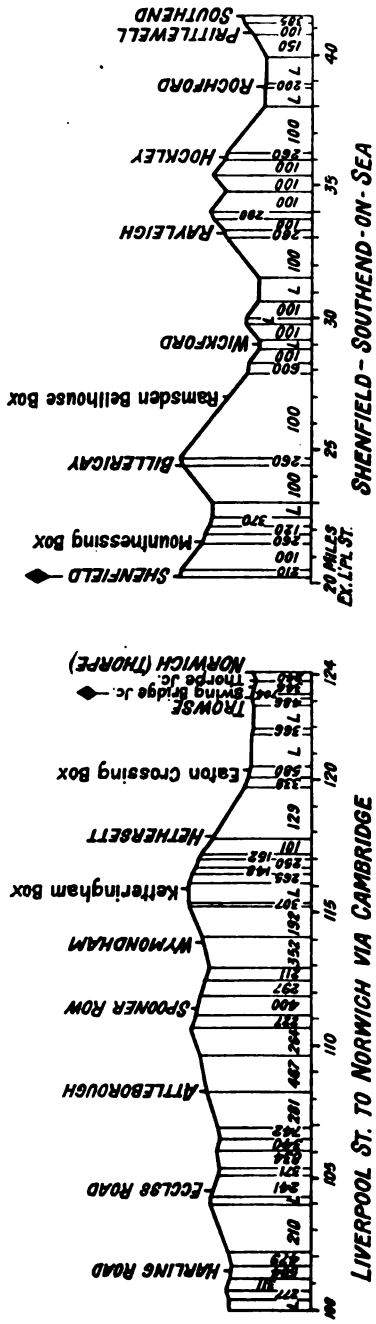


SHEET 12.—GRADIENT PROFILES, LONDON & NORTH EASTERN RAILWAY.

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**Liverpool Street to Norwich via Cambridge.**

*Mile-posts, down side, Liverpool Street (zero) to Norwich.*

| | Miles. |
|---|---|
| LIVERPOOL STREET | 0·0 |
| Bethnal Green Junction | 1·1 |
| Cambridge Heath | 1·8 |
| London Fields | 2·4 |
| HACKNEY DOWNS JUNCTION | 3·0 |
| Clapton | 4·0 |
| *Coppermill Junction (up)* | 4·9 |
| TOTTENHAM HALE | 6·0 |
| Northumberland Park | 6·9 |
| Angel Road | 7·7 |
| Ponder's End | 9·8 |
| Brimsdown | 10·8 |
| Enfield Lock | 11·8 |
| Waltham Cross | 12·8 |
| Cheshunt | 14·0 |
| BROXBOURNE | 17·1 |
| *Broxbourne Junction (up)* | 18·8 |
| Roydon | 20·1 |
| Burnt Mill | 22·7 |
| Harlow | 24·5 |
| Sawbridgeworth | 26·7 |
| *Spelbrook (up)* | 28·2 |
| BISHOP'S STORTFORD | 30·4 |
| Stansted | 33·4 |
| Elsenham | 35·6 |
| Newport | 39·9 |
| AUDLEY END | 41·7 |
| *Littlebury (up) (box not now used)* | 43·8 |
| Great Chesterford | 45·7 |
| Whittlesford | 49·0 |
| Shelford | 52·4 |
| *Trumpington (down)* | 54·6 |
| CAMBRIDGE | 55·7 |
| Barnwell Junction¶ | 57·2 |
| Waterbeach | 61·0 |
| *Stretham Fen (down)* | 65·7 |
| *Sutton Branch Junction (up)* | 69·3 |
| ELY | 70·4 |
| *Ely North Junction (up)* | 71·8 |
| Padnal (up) | 73·2 |
| Shippea Hill | 77·3 |
| Lakenheath | 82·6 |
| Brandon | 86·4 |
| THETFORD | 93·6 |
| Roudham Junction (closed) | 97·8 |
| Harling Road | 101·5 |
| Eccles Road | 104·5 |
| Attleborough | 108·3 |
| Spooner Row | 111·4 |
| WYMONDHAM | 113·9 |
| *Ketteringham (down)* | 115·9 |
| Hethersett | 117·9 |
| *Eaton Crossing (down)* | 120·4 |
| Trowse | 123·1 |
| NORWICH THORPE | 124·1 |

¶ Platforms at Barnwell Junction are on branch only.

*Note.*—Signal-boxes of importance from the timing point of view are included in mileage tables; each signal-box is shown in italics, together with its position on the down or up side of the line, as the case may be. At junction signal-boxes the mileage is shown to the box itself, and not to the junction points; at junction and other stations the mileage is in all cases to the centre of the station.

## MYSORE STATE RAILWAYS (METRE GAUGE.)

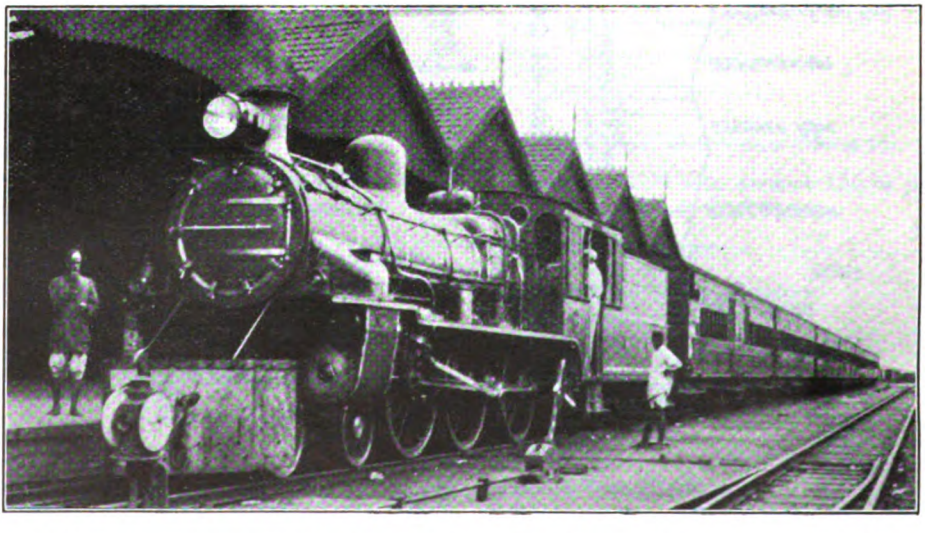

*Photo.*] TRAIN ARRIVING AT BANGALORE CITY. [*C. Travis.*

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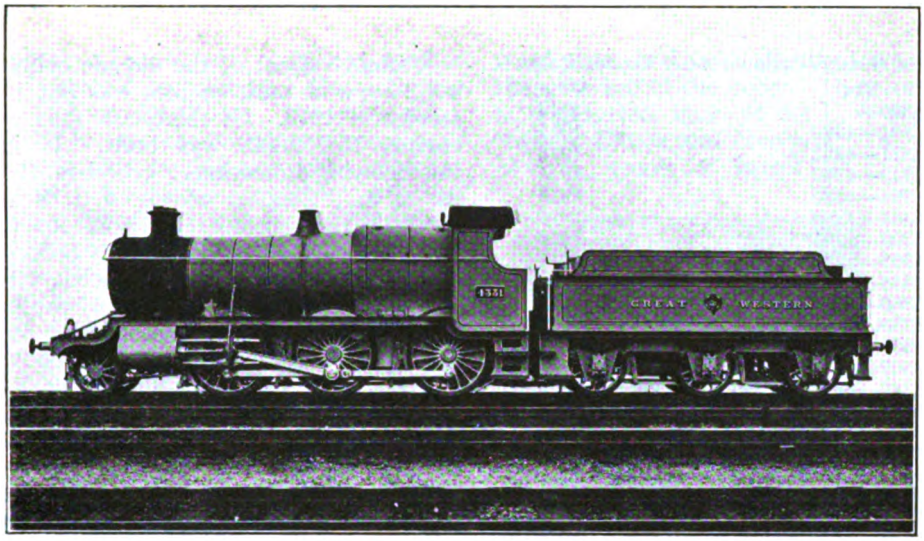


2-6-0 MIXED TRAFFIC ENGINE, FIRST SERIES.

# Modern Locomotive Practice on the Great Western Railway. [No. XIII.]

By F. W. BREWER, A.I.Loco.E.

THE American Mogul type proper, the outside cylinder 2-6-0, made its first appearance on the G.W.R. in 1911. It was Mr. Churchward's next venture, and it proved to be a very successful one. Of this type, which was intended for dealing with mixed traffic, and semi-fast passenger trains, 322 engines were built from 1911 to 1925, 287 at Swindon, and 35 at the works of Robert Stephenson and Co., at Darlington. The coupled wheels of these engines were 5 ft. 8 in., and the cylinders were 18½ in. by 30 in. The boilers (superheated) were of the same size as those of the 2-8-0T's described and worked at 200 lb. per sq. in. At 85 per cent. of that pressure the tractive force was 25,670 lb. The heating surface differed in some of the engines, as it also did in the case of the above-mentioned tank engines, the later figures being 1,670·15 sq. ft. In running order, as turned out for several years, the 2-6-0's weighed 62 tons (tender, 40 tons), and the adhesion was 52 tons 12 cwt. The latter factor was in subsequent examples reduced to 52 tons, and the difference of 12 cwt. was added to the pony truck, which then carried 10 tons instead of 9 tons 8 cwt. These newer engines had external steam-pipes to the cylinders, and had an overall length of 58 ft. 0¾ in., an increase of 9 in. The still more recent 2-6-0's totalled 64 tons, and those built by Stephenson's had 10 tons 6 cwt. on the "pony"; 53 tons 14 cwt. on the coupled wheels; and a length overall of 58 ft. 1¼ in. The 322 engines comprised four series (detailed in the accompanying list), three of which consisted of 100 engines each, and the last series of 22 engines. All were numbered as follows: 4300-4399; 5300-5399; 6300-6399; and 7300-7321. The Stephenson batch bear numbers 6370-6399 and 7300-7304.

Quite lately most of the "5300" series have had the load on the pony truck increased to 11 tons, and these engines, which now weigh 64 tons, have an adhesion weight of 53 tons. The 2-6-0's so altered have a total length over buffers of 59 ft. 0¾ in., and are now officially designated the "8300" class. The cylinders remain 18½ in. by 30 in.



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List of Outside Cylinder 2-6-0 Tender Engines.

| Nos. | Date. |
|---|---|
| 4300— | 1916 |
| 4301—4320 | 1911 |
| 4321—4342 | 1913 |
| 4343—4360 | 1914 |
| 4361—4380 | 1915 |
| 4381—4399 | 1916 |
| 5300—5304* | 1916 |
| 5305—5337* | 1917 |
| 5338—5359* | 1918 |
| 5360—5379* | 1919 |
| 5380—5399* | 1920 |
| 6300—6306 | 1920 |
| 6307—6341 | 1921 |
| 6342—6361 | 1923 |
| 6362—6369 | 1925 |
| 6370—6399† | 1921 |
| 7300—7302† | 1921 |
| 7303—7304† | 1922 |
| 7305—7318 | 1921 |
| 7319— | 1922 |
| 7320—7321 | 1925 |

* Sixty-five of "5300" series have now been re-numbered as the "8300" class.

† Nos. 6370—6399 and 7300—7304 built by Robert Stephenson & Co. All others at Swindon.

By the courtesy of Mr. Collett, I am able to give a separate list of the "8300" class. The 65 engines specified have simply had 3000 added to their former numbers, and they have, therefore, been re-numbered in their original order, No. 8300 having previously been 5300, and so on down the list. The old numbers are, however, inserted for convenience of reference.

List of 5ft. 8 in. 2-6-0 Tender Engines: "8300" class.

| Old No. | New No. | Old No. | New No. | Old No. | New No. |
|---|---|---|---|---|---|
| 5300 | 8300 | 5334 | 8334 | 5365 | 8365 |
| 5301 | 8301 | 5335 | 8335 | 5366 | 8366 |
| 5302 | 8302 | 5337 | 8337 | 5368 | 8368 |
| 5304 | 8304 | 5338 | 8338 | 5369 | 8369 |
| 5305 | 8305 | 5340 | 8340 | 5372 | 8372 |
| 5307 | 8307 | 5341 | 8341 | 5373 | 8373 |
| 5308 | 8308 | 5342 | 8342 | 5374 | 8374 |
| 5309 | 8309 | 5343 | 8343 | 5376 | 8376 |
| 5313 | 8313 | 5344 | 8344 | 5378 | 8378 |
| 5314 | 8314 | 5350 | 8350 | 5379 | 8379 |
| 5315 | 8315 | 5351 | 8351 | 5381 | 8381 |
| 5318 | 8318 | 5352 | 8352 | 5382 | 8382 |
| 5320 | 8320 | 5353 | 8353 | 5383 | 8383 |
| 5322 | 8322 | 5354 | 8354 | 5384 | 8384 |
| 5325 | 8325 | 5357 | 8357 | 5386 | 8386 |
| 5326 | 8326 | 5358 | 8358 | 5387 | 8387 |
| 5327 | 8327 | 5359 | 8359 | 5388 | 8388 |
| 5328 | 8328 | 5360 | 8360 | 5389 | 8389 |
| 5329 | 8329 | 5361 | 8361 | 5390 | 8390 |
| 5331 | 8331 | 5362 | 8362 | 5391 | 8391 |
| 5332 | 8332 | 5363 | 8363 | 5393 | 8393 |
| 5333 | 8333 | 5364 | 8364 | — | — |

A small variant of the outside cylinder 4-4-2 type of tank engines was put into service in 1913. Of this class, only one engine, No. 4600, was built. It had the following dimensions: cylinders, 17 in. by 24 in.; coupled wheels, 5 ft. 8 in.; total heating surface, 1,215·52 sq. ft.; grate area, 16·6 sq. ft.; steam pressure, 200 lb. per sq. in.; tank capacity, 1,100 gallons; weight of engine in working order, 60 tons 7 cwt. The tractive force was 17,340 lb. This engine, which was fitted with a Swindon superheater, and with the standard top-feed arrangement, was broken up in 1925.

Although, as already pointed out, space considerations preclude me from dealing with each of the many varieties of tank engines that came out both in Mr. Armstrong's time and during Mr. Dean's term of office, I may nevertheless state that at this period—from about 1910 onwards—a large number of 0-6-0 saddle tank engines were rebuilt by Mr. Churchward and fitted with wing or pannier tanks. These tanks are rectangular and extend from the cab to the front plate of the smokebox. Owing to their shape they are raised clear of the outside running platform, therein differing from ordinary side tanks, while retaining something of the character of saddle tanks. There are two principal classes of Great Western pannier tank engines, viz., the "2700's," with 17½ in. by 24 in. cylinders (with the exception of 20) and 4 ft. 7½ in. wheels, and the "1901's" with 16 in. by 24 in. cylinders and 4 ft. 1½ in. wheels, the latter mostly with cast-iron centres. The "2700's" have a tractive force of 20,260 lb.; the boiler pressure is 180 lb.; the total heating surface is 1,142·60 sq. ft.; the grate area, 15·45 sq. ft.; the tank capacity, 1,200 gallons; and the weight in working order, 46 tons. The engines of this series are superheated, and are numbered 2700 to 2799 (original dates 1896—1901). Of these, Nos. 2701-2720 have 17 in. cylinders and 165 lb. pressure. In 1928, fifty new superheated 0-6-0 pannier tank engines were ordered to be built to Mr. C. B. Collett's designs at the works of the North British Locomotive Co., Glasgow. These engines, known as the "5700" class, resemble in general appearance the "2700's," except for small

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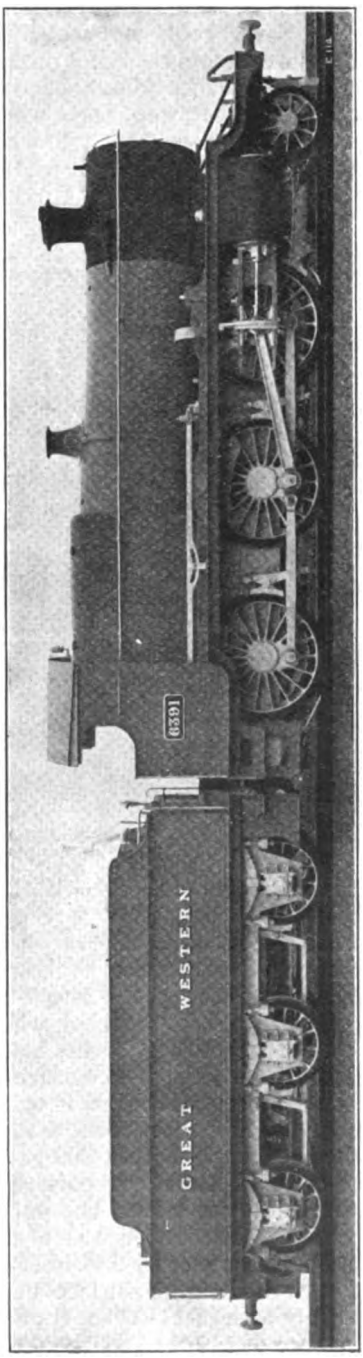
differences in the shape of the coal bunker and external footplating. The cylinders are 17½ in. by 24 in., the wheels are 4 ft. 7½ in., and the total heating surface is 1,178 sq. ft. In this new series, a steam pressure of 200 lb. is employed, whereby the tractive effort is increased to 22,515 lb. The weight of the engines in running order is 47½ tons, and the length over buffers 31 ft. 2 in., as compared with 46 tons and 30 ft. 4⅝ in., in the case of the "2700" class.

The "1901's" on the other hand, are not superheated; they work at 150 lb., have a total heating surface of 980·75 sq. ft., a grate area of 11·16 sq. ft., and a tank capacity of 800 gallons. The tractive force is 17,410 lb., and the weight of the engines (full) is 35 tons 18 cwt. The numbers of this class are 1901 to 1999 (old dates, 1881—1891) and 850 to 872 (1874—1875). It must be understood, nevertheless, that the foregoing batches by no means represent the whole of the pannier tank engines on the G.W.R. There are several other such engines, but the particulars given are sufficient to indicate the two more important varieties. Very similar *full-length* square-sided tanks were tried on the L. & N.W.R. by the late Mr. George Whale in 1904, when one engine was then experimentally provided with them, and subsequently 44 other 0-6-0T's were fitted with them, all of which engines were rebuilds of Mr. Webb's 4 ft. 3 in. coal engines. The two L. & N.W.R. Edge Hill special condensing 0-6-0 tank engines, *Euston* (1875) and *Liverpool* (1876) also had square tanks, but of a shorter length. On this line, the L. & N.W.R., they have sometimes been called saddle tanks.

In the case of the G.W.R., tanks of the pannier form may have had their origin in those fitted to an odd tank engine, No. 1490. This engine was built in 1899, and was of the double-framed 4-4-0 type, with 15½-in. by 26-in. cylinders and 4-ft. 7½-in. coupled wheels. For standard gauge non-tender locomotives, the 4-4-0 wheel arrangement has always been quite exceptional on the G.W.R., and No. 1490 was at that time the only specimen of its type on the line, although another 4-4-0T, No. 13, but of an entirely different class (a rebuild), came out a year or so later. The example of 1899 had what were undoubtedly "wing" or "square" tanks fixed between the smokebox and the cab front-plate, and on a slightly lower level than the top of the boiler. They were, in fact, very like those of the L. & N.W.R. engines, *Euston* and *Liverpool*. The boiler (domed, length of barrel 10 ft. 8 in.,




**2-6-0 LOCOMOTIVE No. 6391, THIRD SERIES.**
Built by R. Stephenson & Co. Ltd.

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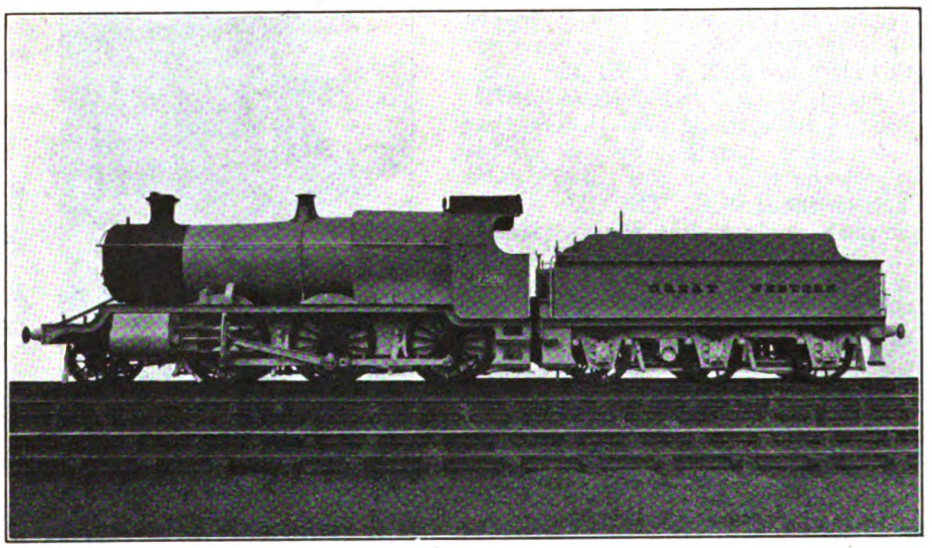
maximum diameter outside 4 ft. 7 in.) was pressed at 165 lb. ; it had a grate area of 20·41 sq. ft., and a total heating surface of no less than 1,428·42 sq. ft. The firebox was rather curious, in that it was very short, but wide, the casing being 4 ft. 6 in. in length and 5 ft. 10 in. in width, with a raised flat-topped roof, on which the safety-valves were mounted. This interesting engine, which had a tank capacity of 1,075 gallons, had 2-ft. 8-in. bogie wheels, and 9-ft. coupling rods. Its full weight was 50 tons 16 cwt. In November, 1907, No. 1490 was sold to the former Brecon & Merthyr Tydvil Junction Railway, and on that line (now part of the G.W.R.) it was numbered 35.

The other 4-4-0T., No. 13, was, as rebuilt, strictly of the old saddle tank order. Originally, it had been a 2-4-2 well-tank engine, with 4-ft. 1-in. coupled wheels, and with outside bearings for the leading and trailing wheels. It was so constructed in 1886. In the early 'nineties, it was rebuilt as a 4-4-0 and fitted with a saddle tank ; the latter, which held 600 gallons of water, enclosed the upper part of the boiler barrel and smokebox, but not the firebox casing. The boiler was a small one, 3 ft. 7¼ in. diameter by 9 ft. in length, and had a total heating surface of 864 sq. ft., a grate area of 11·37 sq. ft., and a steam pressure of 140 lbs. As thus reconstructed, No. 13 weighed 35 tons 19 cwts. The cylinders were 16 in. by 21 in., and the coupled wheels were 4 ft. 1½ in. This little engine worked on the Highworth branch ; it was subsequently transferred to the Liskeard and Looe line, when that railway was absorbed by the Great Western in 1909, and, still later, the engine was sent to Plymouth (North Road).

These two engines, Nos. 1490 and 13, are especially noteworthy for the reason that they were the only standard gauge 4-4-0 tank engines constructed by the G.W.R. Co. As many readers will probably remember, this type (with saddle tanks) was introduced on the broad-gauge by Sir Daniel Gooch as early as 1849. The South Devon, and the Bristol and Exeter (both broad-gauge lines, and now abolished, of course), a few years afterwards adopted the same type, but in an improved form of saddle tank engines.



2-6-0 No. 7320, BUILT AT SWINDON.

While on the subject of tank engines, I may briefly refer to the small shunting locomotives of the "1361" (0-6-0) and "1101" (0-4-0) classes. Both classes have outside cylinders, domed boilers, and overall cabs. The "1361's" have 16 in. by 20 in. cylinders, 3 ft. 8 in. wheels, and saddle tanks. The steam pressure is 150 lb., and the tractive force 14,835 lb. Five examples of this class, Nos. 1361-1365, were turned out at Swindon in 1910 ;

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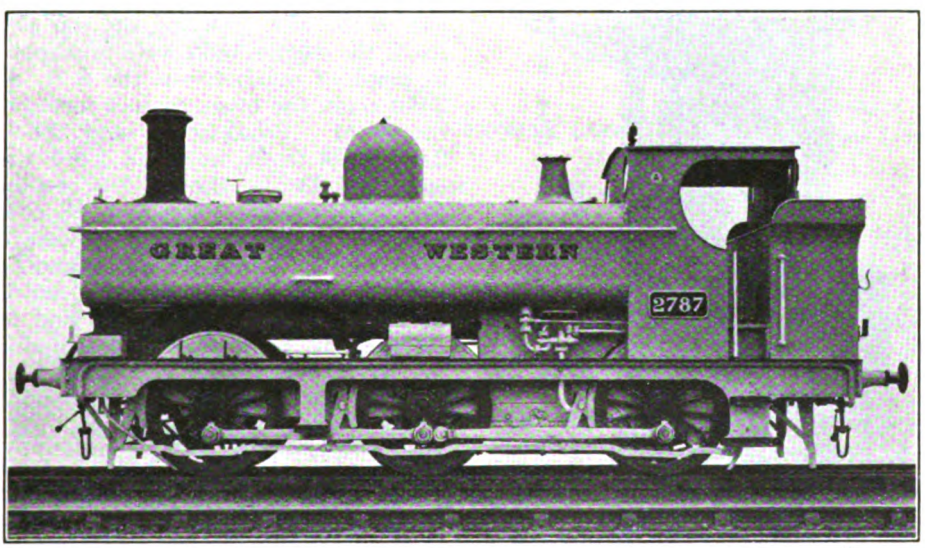
weight in running order, 35 tons 4 cwt.; wheelbase, 11 ft.

The "1101's" weigh 38 tons and have side tanks extending to the smokebox front, and Walschaert valve gear. The cylinders are 16 in. by 24 in., the wheels are 3 ft. 9½ in., and the boiler pressure is 170 lb., giving a tractive effort of 19,512 lb. This class consists of six engines, Nos. 1101-1106, which were constructed to Mr. Collett's order by the Avonside Engine Company, Bristol, in 1926, for shunting purposes at Swansea Docks. These 0-4-0's have a wheelbase of only 6 ft. 6 in., so that they can traverse curves of very short radii. The tanks hold 1,000 gallons; those of the 0-6-0's, 800 gallons. Superheaters are not fitted to these two classes.




0-6-0 PANNIER TANK ENGINE No. 2787.

For working exceptionally heavy express goods, and mixed traffic, Mr. Churchward, in 1919, brought out a 2-8-0 tender engine with 19 in.-by 30-in. outside cylinders, and 5-ft. 8-in. coupled wheels. This notable engine was completed at Swindon in May of the year mentioned, and was numbered 4700. It was a development of Mr. Churchward's standard mineral 2-8-0's, but with larger cylinders and bigger driving wheels. The boiler then fitted to the engine, was of the same size as that adopted for the later examples of the "2800" class; the total heating surface was 2,171·43, sq. ft., the grate area 27·07 sq. ft., and the pressure 225 lb. per sq. in. The tractive effort was 30,460 lb. In running condition, the engine weighed 77 tons 14 cwt., and had 69¼ tons available for adhesion.

Two years after she had been put into service, No. 4700 was, in May, 1921, rebuilt with a much larger boiler than the original one, and the cylinder steam pipes, previously inside, were placed outside the smokebox. The heating surface was increased to 2,521·70 sq. ft., and the grate area to 30·28 sq. ft. The new boiler, the centre line of which was 8 ft. 11¼ in. above rail-level, necessarily added to the weight of the engine, which now became 82 tons, with 73 tons 8 cwts. jointly on the eight-coupled wheels. These wheels were "equalised" in two groups (four wheels in each group), the pony truck, as usual, being "equalised" with the front pair of coupled wheels. The tender held 3,500 gallons of water, and weighed 40 tons. The boiler pressure—and, therefore, the tractive effort—remained as before.

Eight further engines, similar to No. 4700 as rebuilt, were constructed in 1922–23. A list of the nine representatives of this class is supplied herewith. Among other duties, these remarkably fine engines had the task of working 70-wagon "vacuum-fitted" fast goods trains between London and Bristol. They were, and still are, the only eight-coupled loco-



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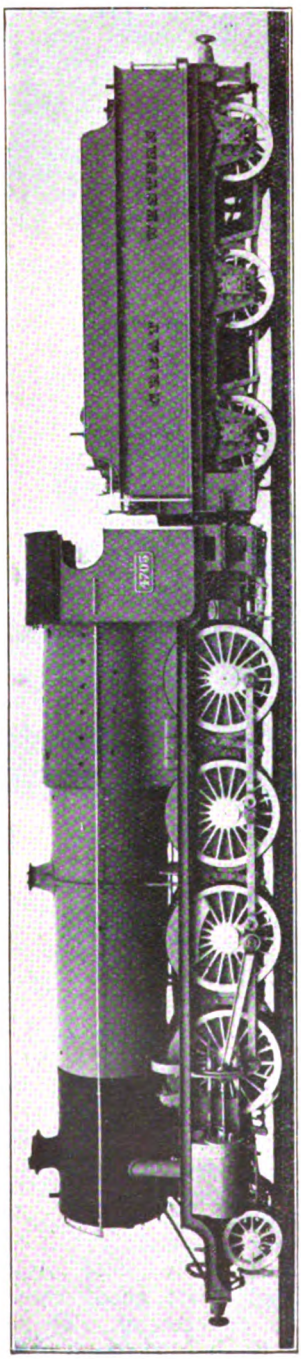
motives in Great Britain with wheels as large as 5 ft. 8 in., a size which enables them to run freely at comparatively high average speeds.

I might add that the smokeboxes of this class, which are longer than usual, have the chimneys near the front end.



**2-8-0 MIXED TRAFFIC LOCOMOTIVE No. 4705.**

Coupled Wheels, 5 ft. 8 in. With large boiler as fitted to No. 4700 two years after it was first placed in service. Nos. 4701–4708 had this boiler when built.

G.W.R.

2-8-0 Tender Engines: "4700" Class.
Cylinders, 19 in. by 30 in.
Coupled wheels, 5 ft. 8 in.

| Nos. | Date. |
|---|---|
| 4700* .. .. .. .. | 1919 |
| 4701—4705 .. .. .. | 1922 |
| 4706—4708 .. .. .. | 1923 |

* Rebuilt with larger boiler (max. dia., 6 ft., length, 14 ft. 10 in.) in 1921.

The others had the larger boilers when new.

No. 4700 was the first engine of note to be turned out at Swindon soon after the end of the war. During the war period itself, the engines built were principally—in point of numbers—of the 5 ft. 8 in. 2-6-0 class, the other engines including a couple of "Princesses," some 2-8-0T's, 2-6-2T's (4 ft. 7½ in.), and 2-8-0 tender engines. Two of the old 7-ft. 4-4-0's of the "Armstrong" class, No. 16 *Brunel*, and No. 14 *Charles Saunders*, were converted to the "Flower" series and fitted with 18 in. by 26 in. cylinders, and 6 ft. 8½ in. coupled wheels, in 1915 and 1917, respectively, being then renumbered 4169 and 4170. The French compound No. 104 *Alliance* was superheated in 1915, and the smaller de Glehn engine, No. 102 *La France*, was rebuilt with a standard superheated taper boiler in 1916. Among the locomotives scrapped were some of the famous 7 ft. 8 in. 4-2-2's. A novel scheme of painting was temporarily adopted, a number of engines of various types and classes being finished in a Khaki shade.

A friend has informed the writer that a paragraph appeared in *Locomotives and Railways* (no longer published), to the effect that the name *Persimmon* was proposed to be given to the second 4-6-0 express engine, No. 98. The writer looked the matter up, and found the paragraph in question in the April, 1903, issue of *Locomotives and Railways*. The June number of that year was the last one to appear of that journal. The name *Persimmon* was not, the writer is told, actually given to No. 98, or to any other G.W.R. engine. When named, No. 98 was at first called *Vanguard* and subsequently, *Ernest Cunard* (now No. 2998).

*(To be continued.)*

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# British Locomotive Practice and Performance.

By CECIL J. ALLEN, M.Inst.T., A.I.Loco.E.

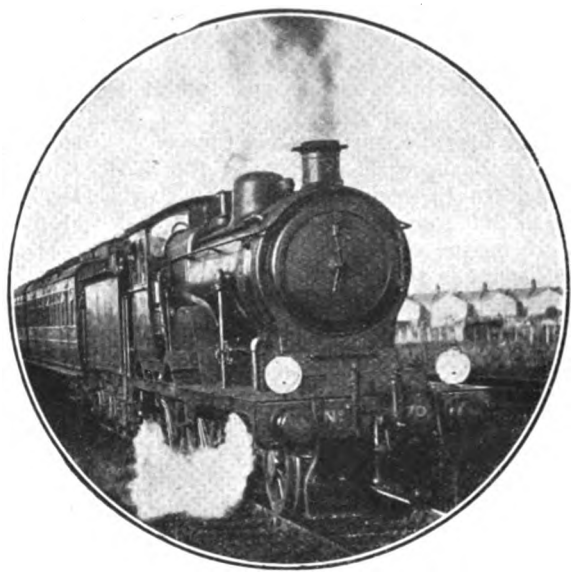

*Photo.*] [*H. Gordon Tidey.*

**UP EXPRESS LEAVING CLACTON-ON-SEA, L.N.E.R.**
G.E. 4-4-0 No. 8870.

FOR various reasons I am so seriously in arrears with descriptions of the journeys that I have recorded during the past year that another month must be spent in consideration solely of locomotive performance. There is, however, this consolation, that to many readers, though not to all, the descriptions of the work of various types of locomotives provide more attractive reading than is afforded by discussion of technical matters bearing on locomotive design. It has been my intention for some time past to give some details of running over the Western Division main line of the L.M.S. system. For some time prior to the introduction of the "Royal Scots," performance over this section was at a distinctly low ebb, and it is for this reason that I have avoided referring at length to running over the West Coast route until matters became more normal. Now that the "Royal Scot" locomotives have come into general use, however, there has been a great improvement, and though the running that one notes behind them is still a little variable in quality, the best performances about to be described indicate pretty clearly that any fault in this respect is attributable to driving or to condition rather than to design.

At the same time, continuous locomotive running over a distance of all but 300 miles—from Euston to Carlisle—with a firegrate of the moderate dimensions employed on the "Royal Scot" type (as compared, say, with the wide firegrate employed in the Gresley "Pacific" design) must provide a ticklish task for an engine-crew when circumstances are at all adverse. They are not to be envied, for example, on the down "Royal Scot" express, with a load between 442 and 482 tare tons from Euston to Crewe and 357 to 377 tons from there forward over Shap Summit to Carlisle, together with tighter running times than during the non-stop period, owing to the Rugby and Crewe stops. Bad weather, poor coal, or an engine out of condition, in such circumstances as these may cause loss of time, and a few signal or permanent-way checks almost certainly will do so, as the records which follow bear witness. Drivers, with the spectre of Shap ahead, are tempted to "nurse" their engines, and even so the famous bank cannot always be breasted to time, after running without respite under onerous conditions for so long a period continuously: it will be noted in the data reproduced later that in but one of four "Royal Scot" runs was time kept from Carnforth to Summit, the loss on the others ranging from 5 min. on an unchecked run to 8 and 12¼ min. on two checked



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runs, on which the checks cost about 6 and 3 min. respectively. But let us consider first the runs south of Crewe.

These begin with a brace on the 5.20 p.m. down Birkenhead express—with its 360 to 390 tons of train, a modest task for an engine of this type. *Royal Scots Fusilier* made the best showing. Passing Willesden in under 10 min., we maintained 57 m.p.h. up the 1 in 330 past Harrow and Hatch End, touched 65 at Watford, and were decelerating very slowly up the subsequent 1 in 330—to 64½ an hour at King's Langley, 60 at Boxmoor and 57½ at Berkhamsted—when we were all but stopped by signal at Tring. The check cost us fully 5 min.; otherwise, we should have passed Tring in 36¼ min. from Euston. The recovery was slow; by Bletchley we were doing 67 m.p.h. and at

L.M.S. RAILWAY. EUSTON—CREWE.

| Distance. | Engine, 3-cyl. 4-6-0 No. .. / Load (axles) .. / ,, (tons tare) / ,, ( ,, full) | Schedule. | 6103 47 341 360 | 6101 51 360 380 | Schedule. | 6110 52 370 400 | 6118 54 377 400 | 6109 62 442 470 | *6116 * 66 *468 *495 | Schedule. | 6142 60 427 450 | 6107 68 482 510 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| miles. | | min. | m. s. | m. s. | min. | m. s. | m. s. | m. s. | m. s. | min. | m. s. | m. s. |
| 0·0 | Euston .. | 0 | 0 00 | 0 00 | 0 | 0 00 | 0 00 | 0 00 | 0 00 | 0 | 0 00 | 0 00 |
| | | | | | | | | | | | p.w.s. | |
| 5·4 | Willesden Jc. .. | 10 | 9 40 | 8 55 | 10 | 9 55 | 10 25 | 11 00 | 10 20 | 10 | 11 15 | 11 00 |
| 11·4 | Harrow .. | — | 16 00 | 15 05 | — | 16 20 | 16 35 | 17 35 | 17 00 | — | 17 25 | 18 10 |
| 17·5 | Watford .. | 24 | 22 10 | 21 35 | 24 | 22 50 | 22 45 | 24 15 | 24 05 | 24 | 23 15 | 25 25 |
| 24·5 | Boxmoor .. | — | 28 55 | 28 50 | — | 29 55 | 29 55 | 31 20 | 31 35 | — | 29 55 | 33 00 |
| | | | sigs. | p.w.s. | | | | | | | | |
| 31·7 | Tring .. .. | 41 | 39 45 | 39 15 | 41 | 38 05 | 37 55 | 39 10 | 40 00 | 41 | 37 30 | 41 00 |
| 40·2 | Leighton .. | — | 48 30 | 47 05 | — | 46 50 | 45 25 | 46 20 | 48 00 | — | 44 45 | 48 30 |
| | | | | | | | sigs. | | | | | |
| 46·7 | Bletchley .. | 55 | 54 25 | 52 40 | 55 | 53 05 | 51 50 | 51 20 | 53 50 | 55 | 50 10 | 54 05 |
| 52·4 | Wolverton .. | — | 59 20 | 57 50 | — | 58 25 | 58 25 | 56 00 | 59 15 | — | 55 00 | 59 05 |
| 59·9 | Roade .. | 68 | 66 20 | 65 50 | 68 | 66 30 | 65 40 | 62 40 | 67 35 | 68 | 62 05 | 66 25 |
| 62·8 | Blisworth .. | 71 | 69 20 | 69 10 | 71 | 69 50 | 68 40 | 65 35 | 71 10 | 71 | 64 55 | 69 30 |
| 69·7 | Weedon .. | — | 75 40 | 76 05 | — | 76 30 | 75 00 | 71 55 | 78 10 | — | 71 30 | 75 50 |
| 75·3 | Welton .. | — | 81 20 | 82 05 | — | 82 30 | 80 30 | 77 30 | 84 20 | — | 77 35 | 81 40 |
| | | | p.w.s. | | | | p.w.s. | | | | sigs. | sigs. |
| 82·6 | Rugby .. | 92 | 90 05 | 90 15 | 91 | †90 45 | 91 25 | 85 30 | 92 30 | 92 | 86 35 | 91 40 |
| 5·5 | Brinklow .. | — | 8 40 | 8 20 | — | 8 50 | 8 50 | — — | 8 10 | — | 93 55 | 99 05 |
| 14·5 | Nuneaton .. | 17 | 17 40 | 17 45 | 17 | 17 50 | 18 05 | — — | 17 15 | 108 | 103 10 | 108 15 |
| 19·7 | Atherstone .. | — | 22 40 | 22 10 | — | 22 55 | 22 30 | — — | 21 40 | — | 108 30 | 112 50 |
| | | | | p.w.s. | | p.w.s. | p.w.s. | | | | p.w.s. | p.w.s. |
| 27·4 | Tamworth .. | 31 | 30·05 | 28 55 | 31 | 30 50 | 29 45 | — — | 28 45 | 122 | 117 30 | 120 50 |
| | | | | | | | | | | | p.w.s. | p.w.s. |
| 33·7 | Lichfield .. | 37 | 36 05 | 35 10 | 38 | 37 25 | 35 40 | — | 34 55 | 128 | 126 35 | 130 25 |
| 41·7 | Rugeley .. | 45 | 44 00 | 43 15 | 46 | 46 20 | 43 25 | — — | 43 35 | 136 | 135 10 | 140 10 |
| 47·0 | Milford .. | — | 49 10 | 48 25 | — | 51 30 | 48 35 | — — | 49 05 | — | 140 15 | 145 25 |
| | | | sigs. | sigs. | | | | | | | | |
| 51·0 | Stafford .. | 56 | 54 55 | 54 40 | 56 | 56 20 | 54 00 | — | 53 45 | 146 | 145 20 | 150 05 |
| 56·3 | Norton Bridge | — | — | — | 63 | 62 45 | 60 50 | — | 59 45 | 153 | 151 35 | 156 25 |
| 60·9 | Standon Bridge | — | — | — | — | 67 50 | 65 45 | — | 64 45 | — | 156 30 | 161 10 |
| 65·0 | Whitmore .. | — | — | — | 74 | 72 30 | 70 30 | — | 69 10 | 164 | 161 00 | 165 40 |
| 70·8 | Betley Road .. | — | — | — | — | 78 10 | 76 35 | — — | 74 45 | — | 166 50 | 171 10 |
| | | | | | | | sigs. | | | | sigs. | |
| 75·5 | Crewe .. .. | — — | — | — | 85 | ‡83 40 | 83 25 | — — | ‡79 30 | 175 | 173 35 | 177 00 |
| 82·6 | Net times | 92 | 84½ | 87½ | 91 | 90¾ | 86 | 85½ | 92½ | 175 | 165½ | 170 |
| 75·5 | (minutes) | 56 | 54¼ | 52½ | 85 | 83 | 82 | — | 80 | | | |

* 70 axles, 493/520 tons, and piloted by 4-cylinder 4-6-0, "Claughton" type, Rugby to Crewe.
† Schedule 93 min. to Rugby. ‡ Signal stop at Crewe South home signals.
Names of engines above: 6101, *Royal Scots Grey*; 6103, *Royal Scots Fusilier*; 6107, *Argyll & Sutherland Highlander*; 6109, *Royal Engineer*; 6110, *Grenadier Guardsman*; 6116, *Irish Guardsman*; 6118, *Royal Welch Fusilier*; 6142, *Lion*.

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Wolverton 72½; Roade Summit was breasted at 55½ m.p.h. and Welton at 54, with an intervening maximum of 66 before Weedon. Despite a signal check outside Rugby we arrived 2 min. early, in a net time which I estimate at 84½ min. for the 82·7 miles. At Rugby the load was increased to 380 tons, and the remainder of the journey to Stafford was without incident, the highest speed reached being 67 m.p.h., at Nuneaton; we gained a minute to Stafford, or 1¾ min. net. On such running as this we might have made Stafford non-stop in 137 min. from Euston, with 360-380 tons.

*Royal Scots Grey* ran a little more moderately, the most remarkable feature of this run being the time—achieved, of course, with the usual banking assistance out of Euston—of 8 min. 55 sec. to Willesden. Speeds were 62½ m.p.h. after Willesden, 53½ at Hatch End, 62½ at Watford, 54 before shutting off steam for the Berkhamsted bridge repair slack, 71½ at Cheddington and Leighton, 69 at Bletchley, 67 at Wolverton and 47½ at Roade, after which the engine was eased. Rugby was reached 1¾ min. early, in a net time of 87½ min. There was some breezy travelling north of Rugby on this trip, with a maximum of 75 m.p.h. at Nuneaton; a p.w. slowing over the colliery pitfall at Polesworth prevented us from gaining much over a minute to Stafford, but the net time from Rugby to Stafford was 52½ min., making a total of 8 min. to engine from Euston. On two other trips with the same express No. 6109, *Royal Engineer*, with 385 tons, took 91 min. 25 sec., or 89½ min. net, from Euston to Rugby, and 54 min. 25 sec., or 53¾ min. net, thence to Stafford; while No. 6110, *Grenadier Guardsman*, with 360 tons, took exact time, or 90 min. net, to Rugby, but was badly checked between there and Stafford, and arrived 5 min. late.

The next group begins with a journey on the 1.30 p.m. down "Midday Scot," on one of the most Arctic days that I can ever remember. It was my misfortune to be travelling to Barrow-in-Furness in the first-class brake coach for Whitehaven, which is the last vehicle on the train, and no steam whatever managed to force its way down the train from the engine to the heating apparatus in my compartment. I was still able to retain some grasp on a pencil, however, and noted that our speeds were 60 m.p.h. at Wembley, 53½ at Hatch End, 62½ at Watford, 51 at Tring, 67 at Wolverton—after very easy travelling from Tring to Bletchley—48½ at Roade, and 43 at Welton, where the engine had been much eased to avoid too early an arrival at Rugby; we were actually 2¼ min. before time. Onwards to Crewe the running was devoid of note, speeds being 68 m.p.h. at Nuneaton, 50½ at Whitmore and 70½ at Betley Road; we should have reached Crewe a shade before time but for the stop outside the station.

Next follow three runs on the "Royal Scot." On the run with *Royal Welch Fusilier* the train was in two parts, and the load was therefore limited to 400 tons in all. The initial running was excellent, Tring being passed nearly 3 min. early; speeds were 60 m.p.h. at Wembley, 57½ at Hatch End, 64½ at Watford, 60 at King's Langley, 56½ at Boxmoor, and 53 up to Tring, followed by 71½–72½ an hour from Cheddington to Leighton; but our progress was then rudely cut short by almost a dead stand for signals at Bletchley. Re-starting, we accelerated splendidly, attaining 67 m.p.h. by Wolverton, after which we fell to 55 at Roade, and attained 65 before Weedon. Despite a bad p.w. check between Welton and Hillmorton, we were only ½ min. late, and on net time we were 6 min. "up" on schedule from Euston to Rugby. There was less to note on the second stage of the run, though here again there was a net gain of 3 min. to the credit of the engine (not allowing for the Polesworth slowing, which is more or less permanent); we touched 69 m.p.h. at Nuneaton, did not fall below 56½ after Lichfield, breasted Whitmore at 48½, and reached 68 at Betley Road.

The run of *Royal Engineer* shown in the next column was timed by a thoroughly competent correspondent, and was one of the best performances in the table. Driver Stones and Fireman Hudson were in charge on the footplate. To Tring, with all allowance for the extra 20 tons of load, the work did not come up to that of *Lion* in the last column but one; the speeds were 52 m.p.h. at Hatch End, 60 at Watford and 54 at the top of the incline. But from Tring there was some tremendously rapid running, speed rising to 80½ m.p.h. on the 1 in 330 between



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1. EDINBURGH-LONDON EXPRESS NEAR PENRITH, L.M.S. 4-6-0 No. 6102, "BLACK WATCH." *Photo. C. J. L. Romanes.*

2. UP EXPRESS LEAVING CREWE, L.M.S. 4-6-0 No. 6146, "JENNY LIND." *Photo. W. H. C. Kelland.*

3. DOWN EXPRESS, L.M.S. 4-6-0 No. 6110, "GRENADIER GUARDSMAN." *Photo. F. R. Hebron.*

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Cheddington and Leighton, and to 76½ at Wolverton; the 23·1 miles from Tring to Castlethorpe occupied 18 min. 45 sec., representing an average speed of all but 74 m.p.h. Roade was cleared at 57¼ m.p.h.; 69 an hour was touched at Weedon; Kilsby was breasted at 56; and 61½ m.p.h. at Hillmorton concluded the run, Rugby being reached in 85½ min. 5½ min. early. Between Rugby and Crewe my correspondent, occupied with what another friend once described as "the grosser pleasures of the dining-car," took no notes other than recording that Rugby was left a minute late, and Crewe reached 5 min. early, which would give a time of roughly 79 min., and a net non-stop equivalent of about 163 min. from Euston to Crewe. But the fine running of the same engine north of Crewe figures later in the article.

*Irish Guardsman* found the load of 495 tons in the next column rather too onerous for timekeeping, and we lost 1½ min. to Rugby. Speed at Hatch End fell to 50½ m.p.h., and did not rise above 58½ at Watford; at Tring we fell to 48½ m.p.h., but touched 71½ at Cheddington. At Roade the minimum was 45 m.p.h. The addition of an extra coach at Rugby, making up a 70-axle train, still left the total tare—493 tons—2 tons inside the specified maximum of 495 tons for "Royal Scot" engines on "Limited Load" trains, but we took a "Claughton" as pilot, for all that. The going was now rather more energetic; we touched 72½ m.p.h. at Nuneaton and 71½ before the Polesworth slack; 54 m.p.h. was the minimum rate at Whitmore and 72½ the maximum at Betley Road. Apart from the signal check outside Crewe, we should have completed this journey in 80½ min., or 4½ min. inside schedule time.

The table is completed with details of a couple of heavily-loaded journeys on the 10.25 a.m. down Liverpool and Manchester express. Of these the first, with *Lion* at the head of the train, was quite an exhilarating experience. The early p.w. check, near Willesden, cost us probably about 1½ min.; after that we went ahead in great style, passing Watford at 67 m.p.h., King's Langley at 64½, Boxmoor at 61 and Berkhamsted at 55½ an hour, which was the minimum rate on the ascent; then we well sustained 76½ m.p.h. past Leighton and 70½ from Bletchley to Wolverton. There was no easing as yet, for we breasted Roade Summit at 58½ m.p.h., passing Roade 6 min. early, touched 68 before Weedon, and achieved a minimum of 61½ at Kilsby Tunnel. Unchecked, we might have been through Rugby in 83½ min.; with the two checks we were still 5½ min. early. Such easy running followed that there was nothing further worth noting in the way of speed; we had the usual p.w. check at Polesworth, and a very bad relay check at Hademore, near Lichfield, not to mention signals on outside Crewe, but still contrived to arrive 1½ min. early. Net time on this trip was 165½ min., notwithstanding the easy running referred to, showing a gain of 9½ min. to locomotive. *Argyll and Sutherland Highlander* had a tougher task with 510 tons, and just failed by 2 min. to keep time, though delays totalling 7 min. meant a net gain of 5 min. to the engine. Speeds were 46 m.p.h. at Hatch End, 62½ at Watford, 53½ at Tring—the running from Watford to Tring with such a load was excellent—72½ at Cheddington, 68 at Bletchley, 70½ at Wolverton, 53½ at Roade, 65 at Weedon, 53½ at Kilsby and 64 at Hillmorton, after which we were nearly stopped by signal outside Rugby. For all that No. 6107 passed Rugby just inside time. There was a speed of 68 m.p.h at Nuneaton, and we just contrived to reach 61 between the Polesworth check and the very bad relay check at Hademore. From Rugeley to Milford we were travelling at 60–61 m.p.h., and after the Stafford slowing we ran all the way from Norton Bridge to Whitmore at a speed varying but little from 55 m.p.h., another good performance. With a maximum of 71½ m.p.h. at Betley Road and a slight signal check outside, we stopped at Crewe, after a performance of which the driver had no reason to be ashamed, 2 min. late.

Before leaving the down direction of running, I am reminded of a singular journey on the down "Royal Highlander," when with a 72-axle train of 525 gross tons, we left Euston in charge of two "Claughtons" for the summer non-stop run to Crewe. All went well at first, with times



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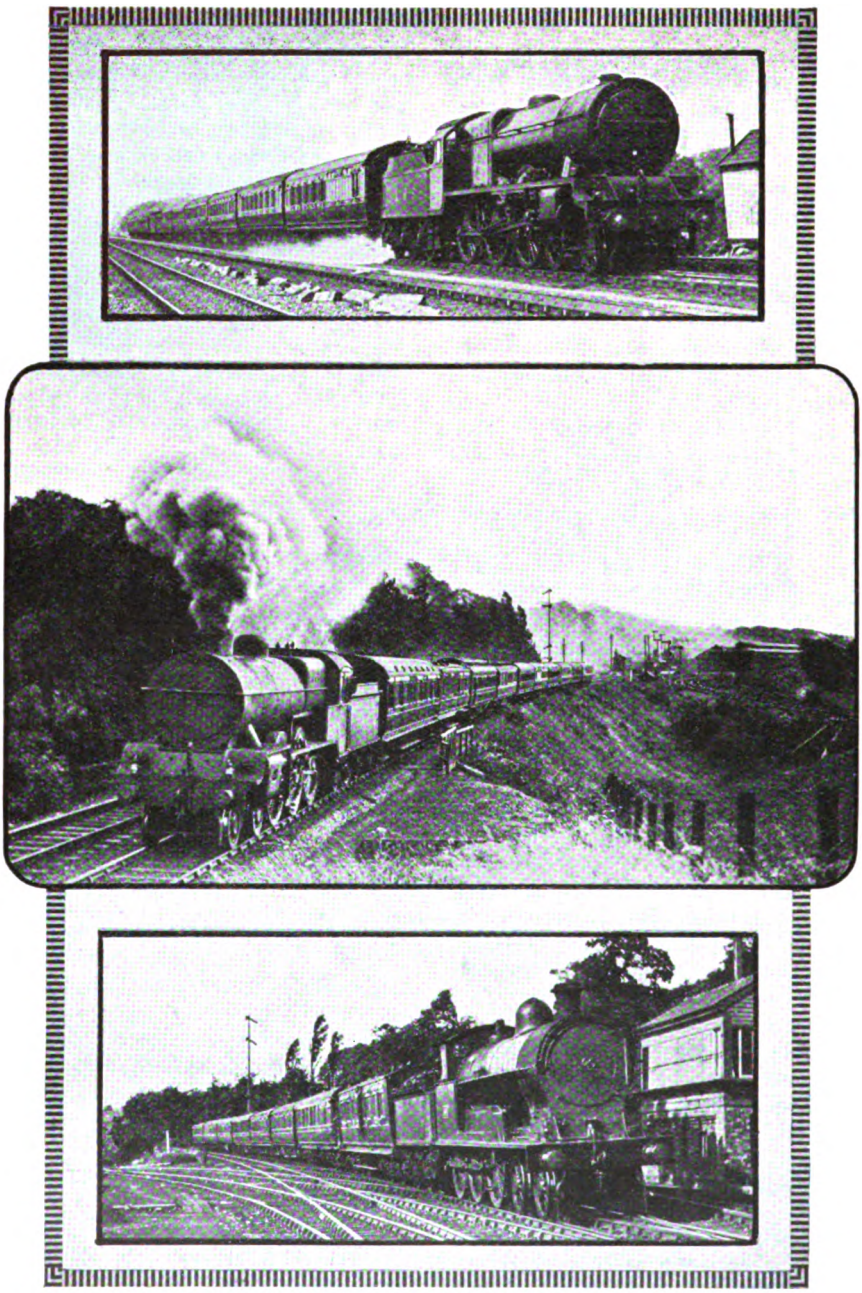

1. UP WEST COAST EXPRESS. L.M.S. 4-6-0 No. 6106, "GORDON HIGHLANDER."
2. DOWN WEST COAST EXPRESS AT GRAYRIGG. L. & Y. 4-6-0 No. 10462.
3. UP WEST COAST EXPRESS NEAR OXENHOLME. L.N.W. "PRINCE" CLASS 4-6-0.

*Photos. by H. Gordon Tidey.*

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of 9 min. 55 sec. to Willesden, 40 min. 55 sec. to Tring, 55 min. 35 sec. to Bletchley, and 70 min. to Roade. Then the running began to deteriorate, and we took 96½ min. to Rugby, and 113 min. 35 sec. to Nuneaton, while finally we pulled up at Tamworth, in 127½ min. from Euston, the leading engine having seen fit to develop some defect which necessitated its removal from the train. No. 5916, *Tootal Broadhurst*, therefore essayed the remainder the journey with the largest load I have ever known to be hauled by an unassisted "Claughton." Progress was at first slow, speed rising to 43½ m.p.h. at Hademore, and then falling to 41 up the subsequent 1 in 330, but we reached 55 at Rugeley; after a scrupulously careful slack at Stafford, we touched 46 m.p.h. at Norton Bridge, fell to 43 at Whitmore and attained our final maximum of 65 at Betley Road. Times were 11 min. 20 sec. from Tamworth to Lichfield, 21 min. 20 sec. to Rugeley, 31½ min. to Stafford, 39 min. 25 sec. to Norton Bridge, 50 min. 40 sec. to Whitmore, 57¼ min. to Betley Road, and 65 min. or 63 min. net, to Crewe. One cannot help remarking how far inferior this is to the work of the "Royal Scots," as already recorded, although, engine for engine, the latter are only 8 tons, or 10 per cent., the heavier machines of the two.

It is impossible to devote much space to the return journey from Crewe to Euston, and I will therefore confine myself to three up runs of unusual merit. The first of these was timed by the correspondent whose "Royal Scot" journey has already been mentioned, and the times of this I have tabulated with the relevant speeds in the adjacent column. It was without question a very remarkable trip, and Driver Blades and Fireman Griffiths, aided by a 16 min. late start, gave a striking demonstration of the real tractive powers of these engines. No exceptional downhill speeds were registered; from 75 to 76½ m.p.h., reached at Great Bridgeford, Hademore, Weedon, Castlethorpe, and King's Langley, were the most extreme figures. Neither were any of the uphill minima, such as 45 an hour at Madeley, 56½ at Atherstone and Shilton, and 52 at Tring, in the nature of records. But it was the uniformly high speed maintained throughout, until the engine

L.M.S. 10.50 A.M. CREWE—EUSTON.

Engine: 3-cyl., 4-6-0; No. 6149, *Lady of the Lake*. Load: 48 axles, 357 tons tare; 375 tons full.

| Distance. | —— | Sch. | Actual. | Speed. |
|---|---|---|---|---|
| miles | | min. | m. s. | m.p.h. |
| 0·0 | Crewe .. .. | 0 | 0 00 | — |
| 4·7 | Betley Road .. | — | 7 50 | 45 |
| 7·9 | Madeley .. | — | 12 40 | 45 |
| 10·5 | Whitmore .. | 15 | 15 20 | 53 |
| 14·6 | Standon Bridge | — | 19 15 | 68 |
| 19·2 | Norton Bridge | 24 | 23 10 | 73½ |
| 21·2 | Gt. Bridgeford | — | 24 45 | 75 |
| 24·5 | Stafford .. | 30 | 27 45 | *40 |
| 28·5 | Milford.. .. | — | 32 55 | 60 |
| 30·9 | Colwich .. | — | 35 15 | 64 |
| 33·8 | Rugeley .. | 40 | 38 00 | 67 |
| 37·0 | Armitage .. | — | 40 55 | 65 |
| 41·8 | Lichfield .. | 48 | 45 15 | 67 |
| 48·1 | Tamworth .. | 55 | 50 30 | †75 |
| 51·6 | Polesworth .. | — | 53 50 | 62½ |
| 55·8 | Atherstone .. | — | 58 10 | 56½ |
| 61·0 | Nuneaton .. | 69 | 63 10 | 64 |
| 64·3 | Bulkington .. | — | 66 55 | 56½ |
| 70·0 | Brinklow .. | — | 72 00 | 69 |
| 75·5 | Rugby .. .. | 85 | 77 15 | *40 |
| — | Hillmorton Box | — | 80 15 | 48 |
| 82·8 | Welton.. .. | — | 86 10 | 56½ |
| 88·4 | Weedon .. | — | 91 10 | 75 |
| 95·3 | Blisworth .. | 107 | 97 15 | 67 |
| 98·2 | Roade .. .. | 110 | 100 00 | 62½ |
| 105·7 | Wolverton .. | — | 106 20 | ‡75 |
| 111·4 | Bletchley .. | 124 | 111 40 | 62½ |
| 117·9 | Leighton .. | — | 118 05 | 60 |
| 122·0 | Cheddington .. | — | 122 20 | 57½ |
| 126·4 | Tring .. .. | 141 | 127 20 | 52 |
| 130·1 | Berkhamsted .. | — | 131 05 | 67 |
| 133·6 | Boxmoor .. | — | 134 00 | 72½ |
| 137·1 | King's Langley | — | 136 55 | 76½ |
| 140·6 | Watford .. | 155 | 140 00 | 64 |
| 146·7 | Harrow .. | — | 146 45 | 65 |
| 152·7 | Willesden Jc. .. | 167 | 152 00 | §72 |
| 158·1 | Euston.. .. | 175 | 159 10 | — |

* Service slack. † At Hademore Troughs.
‡ At Castlethorpe Troughs. § At Wembley.

was definitely eased at Watford—to avoid too early an arrival—that made the run what it was. It would have been perfectly easy to reach Euston in 157 min., "even time" having been bettered by Watford; the time of 159 min. 10 sec. actually recorded represented a gain of all but 16 min. on what is, of course, a schedule of but moderate difficulty with a load of only 375 tons all told.

Another similar run, with a 58-axle train weighing 405 tons empty and 425 tons full, was made by the "Lakes Express" last summer, the engine being

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No. 6114, *Coldstream Guardsman*, driven by Hastie, whose progress was as rapid as might have been foreshadowed by his name. Checks were experienced between Stafford and Nuneaton, but from there the passing times were 14¼ min. to Rugby, 23½ min. on to Roade, 11½ min. from there to Bletchley, 14 min.—the best running of the journey—from Bletchley up to Tring, 12½ min. down to Watford and 11¼ min. on to Willesden, with a very slow finish of 9 min. from Willesden into Euston. This was all the information concerning the run that the observer was able to supply, but it has been confirmed by the authorities at Euston. The 97·1 miles from passing Nuneaton to Euston were thus run in 96 min., and with the faster travelling often made from Watford, this could easily have been cut to 93 min. Checks included, the time from Stafford to Euston was 140¼ min., instead of the 145 min. allowed.

Many of my runs with other types, and with "Claughtons" especially, are a record of barely-kept or of lost time, the 12.5 p.m. from Manchester to Euston, non-stop from Stoke, having been a particularly bad offender. On the up Aberdeen express due at 7.30 p.m., however, "Claughton" No. 5976 made a smart trip with 320 tons from Blisworth, passing Roade in 5 min. 20 sec.; Wolverton, at 71½ m.p.h., in 12¼ min.; Bletchley, at 61½ m.p.h., in 17 min. 55 sec.; Leighton, at 60 m.p.h., in 24 min. 25 sec.; and Tring, at 48 m.p.h., in 33 min. 55 sec.; after this we ran from Tring to Watford in 12 min. 50 sec., and on to Willesden in 10 min. 25 sec., with sustained maxima of 72½ m.p.h. on both stages, and with a very fast finish reached Euston, 62·9 miles, in 63 min. 40 sec., instead of the 68 min. booked. At Willesden we had just beaten "even time," having covered 57·5 miles from the start in 57 min. 10 sec. No. 5985 took the down "Lakes Express," weighing 325 tons, to Rugby in 89 min. 50 sec., instead of 93 min., passing Tring in 41 min. 10 sec., and making some fast running from there; from Rugby we passed Stafford in 54 min. 50 sec., and should have been through Crewe in 81 min. (allowed 84 min.), but for a bad signal check outside.

We must now pass rapidly to the runs further northward, between Crewe and Carlisle. These begin with a couple on the 1.30 p.m. down "Midday Scot"—a train whose working has been greatly eased since pre-war days. Then it was allowed 59 min. with the full load, Aberdeen and Whitehaven portions included, from Crewe to Preston, and 104 min. from Preston to Carlisle—total 163 min.; to-day it leaves the Aberdeen and Whitehaven portions at Crewe, and is allowed 86 min. from Crewe to Lancaster and the same time thence to Carlisle, total 172 min., or 9 min. more. The first of these runs has been previously described, but not tabulated. *Comet* made a very leisurely start out of Crewe, but then got away to some purpose, attaining 77½ m.p.h. before Weaver Junction, and taking the junction itself at a somewhat electrifying speed; but beyond Warrington, passed just over a minute early, there was an easing, and beyond a minimum of 46½ m.p.h. at Coppull Summit, and a sustained speed of 64½ to 67 an hour along the faintly rising grades from Brock to Galgate, there was nothing further of note to Lancaster. Allowing for the three bad signal checks, net time to Lancaster was 80½ min., or 5½ min. under booked time.

From Lancaster the runs of *Comet* and *Novelty* may be taken together. Speeds at Carnforth were 66 and 65 m.p.h. respectively; the subsequent 1 in 131 to near Burton was breasted at 52 m.p.h. on both runs, and the main climb to Grayrigg was begun, at Milnthorpe, with speeds of 64 and 65 m.p.h. respectively. By Oxenholme the speeds had fallen to 44½ and 43½ m.p.h., and up Grayrigg bank the variations in speed were between 35 and 33 m.p.h. on the first run and 39 and 35 on the second, which, with a load heavier by 60 tons, showed the better climbing. Before Tebay the respective rates rose to 66 and 76 m.p.h., and Shap incline proper was mounted at a minimum of 24 m.p.h. on both occasions, the two engines having gained 3½ and 4 min. respectively from Lancaster. The train on the first run being early, a very moderate descent was made to Carlisle, and there was little hurry on the second trip, either; *Comet* achieved a net gain of 8 min. from Crewe, and *Novelty* of 5 min. from Lancaster.

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L.M.S. RAILWAY. CREWE-CARLISLE.

| Distance. | Engine— 3 cyl., 4-6-0 No. / Load— (axles) .. / (tons tare) .. / ( ,, full) .. | Schedule. | 6129 / 42 / 293 / 310 | 6127 / 50 / 346 / 370 | Schedule. | 6109 / 50 / 357 / 375 | 6116 / 54 / 377 / 400 | 6118 / 54 / 377 / 400 | *5000 / 57 / 402 / 415 | Schedule. | 6109 / 54 / 377 / 400 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| miles. | | m. | m. s. | m. s. | m. | m. s. | m. s. | m. s. | m. s. | m. | m.s. |
| 0·0 | Crewe .. .. | 0 | 0 00 | — | 0 | 0 00 | 0 00 | 0 00 | 0 00 | 176 | 170 00 |
| 4·9 | Minshull Vernon | — | 8 30 | — | — | 7 45 | 7 35 | 7 55 | 8 20 | — | 163 50 |
| 8·8 | Winsford Jc. .. | 11 | 12 15 | — | 10 | 11 35 | 11 30 | 11 45 | 12 00 | 165 | 159 20 |
| 11·8 | Hartford .. | — | 14 50 | — | — | 14 10 | 14 10 | 14 35 | 14 35 | — | 157 10 |
| 16·2 | Weaver Jc. .. | 18 | 18 30 | — | 18 | 18 00 | 18 15 | 18 55 | 18 25 | 157 | 152 40 |
| 21·3 | Moore .. .. | — | 23 00 | — | — | 23 00 | 22 45 | 24 10 | 22 50 p.w.s. | — | 147 25 |
| 24·1 | Warrington .. | 27 | 25 50 | — | 28 | 26 05 | 25 35 | 26 50 sigs. | 26 25 | 148 | 144 00 |
| 27·5 | Winwick Jc. .. | 31 | 29 55 | — | 32 | 30 05 p.w.s. | 29 10 | 30 45 p.w.s. | 30 30 | 144 | 140 30 |
| 29·9 | Golborne Jc. .. | — | 31 45 | — | — | 33 55 | 31 50 sigs. | 34 55 | 33 10 | — | p.w.s. |
| 33·2 | Bamfurlong .. | — | 35 30 sigs. | — | — | 39 00 | 37 00 | 40 05 | 36 45 | — | 133 15 |
| 35·8 | Wigan .. | 41 | 41 00 | — | 41 | 41 45 | 40 10 | 43 15 | 39 15 | 135 | 130 30 |
| 39·1 | Standish Jc. .. | 45 | 46 30 | — | 45 | 45 45 | 45 10 | 48 10 | 43 10 | 131 | 127 15 |
| 41·6 | Coppull .. | — | 49 40 sigs. | — | — | 48 50 | 48 50 | 51 50 | 46 15 | — | 124 20 |
| 45·5 | Euxton Jc. .. | 53 | 53 30 sigs. | — | 53 | 52 00 p.w.s. | 52 50 | 55 35 | 49 40 | 124 | 118 40 p.w.s. |
| 48·7 | Farington .. | — | 58 55 | — | — | 55 15 | 56 20 | 58 30 | 52 35 | — | 114 00 |
| 51·0 | Preston .. | 60 | 63 00 | — | 61 | 60 45 | 59 55 | 61 55 | 55 35 | 116 | 110 20 sigs. |
| 55·7 | Barton.. .. | — | 70 15 | — | — | 67 35 | 67 00 | 68 45 | 62 50 | — | 103 20 |
| 60·5 | Garstang .. | 72 | 75 00 | — | 72 | 72 00 | 71 40 | 73 15 | 67 30 | 105 | 99 05 |
| 67·6 | Galgate .. | — | 81 30 | — | — | 78 35 | 78 50 | 80 10 | 74 10 | — | 92 20 |
| 72·0 | Lancaster .. | 86 | 86 45 | 0 00 | 84 | 82 30 | 83 20 | 84 55 | 78 10 | 92 | 87 15 |
| 75·1 | Hest Bank .. | — | 5 20 | 5 05 | — | 85 15 p.w.s. | 86 05 | 87 55 | 80 50 | — | 84 00 |
| 78·2 | Carnforth .. | 9 | 8 30 | 8 20 | 90 | 91 20 sigs. | 88 55 | 90 45 | 83 40 | 85 | 81 00 |
| 82·7 | Burton .. | — | 13 20 | 13 10 | — | 97 40 | 93 45 | 95 00 sigs. | 88 20 | — | 76 50 |
| 85·5 | Milnthorpe .. | — | 15 55 | 15 50 | — | 100 40 | 96 20 | 98 35 | 91 00 | — | 74 25 |
| 91·1 | Oxenholme .. | 25 | 22 20 | 22 30 | 104 | 108 30 | 103 10 | 108 40 | 97 30 | 72 | 69 15 p.w.s. |
| 94·5 | Hay Fell Box.. | — | 27 30 | 27 35 | — | 114 30 | 108 40 | 114 50 | 103 00 | — | 65 15 |
| 98·1 | Grayrigg .. | — | 33 25 | 33 20 | — | 120 50 | 115 25 | 121 45 p.w.s. | 110 00 | — | 61 45 |
| 99·9 | Low Gill .. | — | 35 50 | 35 35 | — | 123 20 | 118 10 | 125 15 | 112 30 | — | 58 30 p.w.s. |
| 104·1 | Tebay .. .. | 42 | 40 05 | 39 40 | 122 | 127 40 | 123 40 | 131 15 | 116 40 | 58 | 53 20 |
| 107·1 | Scout Green Box | — | 43 50 | 43 25 | — | 131 30 | 129 15 | — | 120 20 | — | 50 50 |
| 109·7 | Shap Summit | 53 | 49 30 | 49 05 | 133 | 136 35 | 136 55 | 143 50 | 126 40 | 52 | 48 15 |
| 111·7 | Shap .. .. | — | 52 25 | 51 50 | — | 139 20 | 140 00 | 146 50 | 129 30 | — | 45 20 |
| 119·0 | Clifton .. | — | 59 40 | 58 50 | — | 146 05 | 147 00 | 153 45 | 135 55 | — | 32 40 |
| 123·2 | Penrith .. | 67 | 64 00 | 63 00 | 147 | 150 20 | 151 00 | 157 55 | 139 40 | 29 | 27 30 |
| 128·0 | Plumpton .. | 72 | 69 35 | 68 05 p.w.s. | 152 | 155 10 | 155 35 | 162 30 | 144 15 | 22 | 22 00 |
| 136·2 | Wreay .. | — | 77 30 | 76 10 | — | 161 30 | 162 15 sigs. | 169 10 | 151 35 | — | 10 50 |
| 141·0 | Carlisle .. | 86 | 83 30 | 82 00 | 165 | 166 30 | 168 50 | 174 20 | 157 00 | 0 | 0 00 |
| 141·0 | Net times (min.) | 86 | $\left\{\begin{matrix}8\ \frac{1}{2}+ \\ 83\frac{1}{2}\end{matrix}\right\}$ 81 | | 165 | 154 | 165 | 163 | 156 | 176 | 163 |

Names of engines above :—6109, *Royal Engineer* ; 6116, *Irish Guardsman* ; 6118, *Royal Welch Fusilier* ; 6127, *Novelty* ; 6129, *Comet* ; 6139, *Ajax*. * G.W. 4-cyl. 4-6-0, *Launceston Castle*.

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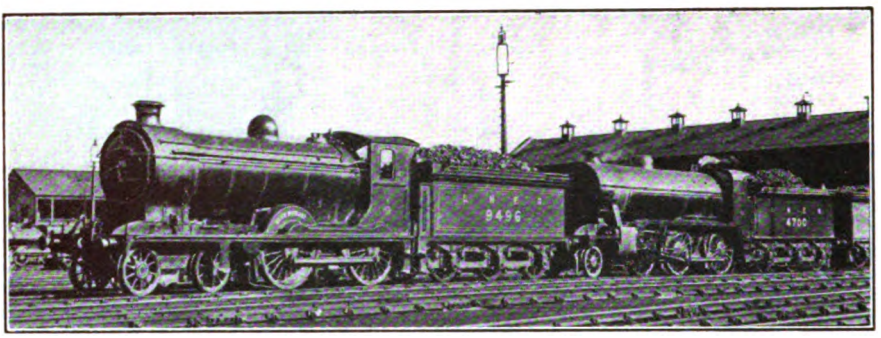


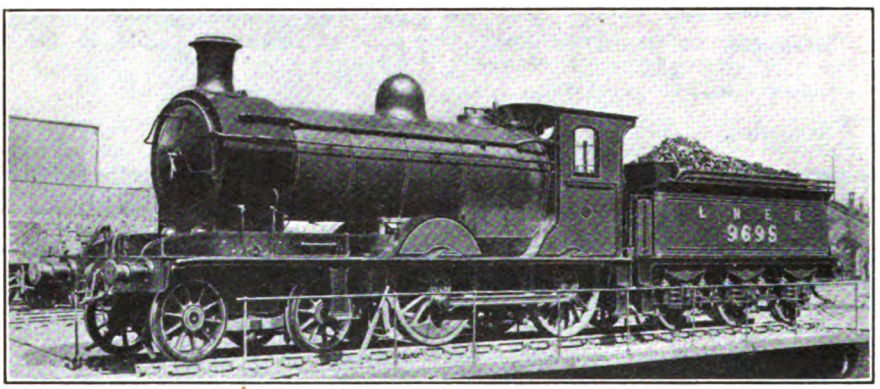

**1. N.B. 4-4-0 No. 9496, "GLEN MOIDART" AND G.N. 2-6-0 No. 4700.**

**2. N.B. 4-4-0 No. 9695, REBUILT "WEST HIGHLAND" CLASS.**

**3. 1.15 P.M. UP EAST COAST EXPRESS NEAR PORTOBELLO. 4-6-2 No. 2563, "WILLIAM WHITELAW."**

*Photos. R. D. Stephen.*

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Next follow three runs on the "Royal Scot" express. This also has been slowed from its pre-war timing, being now allowed 165 min. from Crewe to Carlisle, as against 159 min. The first trip, with the lightest of the three loads, followed on the exploits of *Royal Engineer* between Euston and Crewe, already described. Driver Stones got away well from Crewe, with a sustained speed of 72 m.p.h. onwards from Hartford, but slowed to 56 at Weaver Junction and did not exceed 65 at Moore. Easy running followed from Warrington, and the bridge renewal check at Golborne Junction reduced the 2 min. gain at Winwick to ¾ min. arrears at Wigan. Standish Summit was breasted at 48 m.p.h., and then followed the unusual maximum of 79 before Euxton Junction, where there was a slack to 65 an hour. Preston was passed on time, despite two checks, and speed ranged between 64 and 68 m.p.h. from Barton to Galgate. After a maximum of 68 m.p.h. through Lancaster there were two very severe checks approaching Carnforth, which so hampered the next stage to Oxenholme that speed fell to 48 m.p.h. before Burton, did not rise above 55 at Milnthorpe, and was not above 35 to 32 m.p.h. from Oxenholme to Grayrigg. There was some recovery then, however, as Tebay was passed at 67 m.p.h., and the minimum up Shap was 23 m.p.h., 2 min. of the 5¾ min. arrears at Tebay being recouped before the summit was cleared. From Shap to Penrith the maximum rate was 72 m.p.h., but after exemplary slowings over Eamont Junction and through Penrith there was some very rapid travelling on to Carlisle, speed rising to no less than 83½ m.p.h. at Southwaite. *Royal Engineer* therefore drew up in Carlisle only 1½ min. late, having made a net time, as nearly as I can estimate, of 154 min. from Crewe, or 11 min. under schedule. Added to the 11½ min. credited to engine between Euston and Crewe, Driver Stones had a total of 22½ min. net gain from London to Carlisle of which to be proud, while my correspondent is to be congratulated at having been present on the train to record a performance of such merit.

My own two runs, with a 400-ton train, were considerably inferior to this. *Irish Guardsman*, leaving Crewe 3 min. late, started well, touching 71½ m.p.h. at Acton Bridge, and 69 at Moore, so that we passed Winwick Junction on time, but a signal check at Golborne put us 2 min. in arrears again. From Wigan, the driver held his own as far as Oxenholme, but from there he lost 4¾ min. to Shap Summit, and made little attempt to recover the loss to Carlisle, where, with a slight check below Wreay, we arrived 7 min. late. Net time throughout was exactly as booked. Principal speeds were 70½ m.p.h. through Lancaster, 67 at Carnforth, 61½ at Milnthorpe, 41½ at Oxenholme, 26½ at Grayrigg, no more than 45 through Tebay—it seemed clear here that the engine was running short of steam—and 17½ at Shap Summit. Maximum speed at Southwaite was 79 m.p.h.

*Royal Welch Fusilier* did but little better. In this case, a punctual start from Crewe was converted to a Carlisle arrival 9¼ min. late, caused by bad p.w.r. checks at Golborne Junction and Low Gill, and a disastrous signal check, which all but stopped us, at Milnthorpe. We did not hurry from Crewe to Warrington, and after the Golborne check were 3¼ min. late at Standish; by a slight recovery we were then only a minute behind at Preston, but the two subsequent checks took all the heart out of driver and engine. Speeds were 66 m.p.h. at Winsford Junction, 45 at Weaver Junction, 70½ at Moore, 33 at Standish, 66 at Balshaw Lane, 55 at Euston, 69 at Farington, 65 at Brock, 61 at Galgate, 72½ at Carnforth, 55½ at Burton, and 64 before the Milnthorpe check. Above Hincaster, we managed to get up to 41½ m.p.h., but fell to 27½ at Grayrigg; after the Low Gill slowing, we attained 54 an hour at Tebay, but dropped to 16½ up Shap. Then followed some brisk running down to Carlisle, with top speeds of 72½ an hour at Clifton Junction, and a momentary 80 at Southwaite. I had one further run behind *Ajax* (No. 6139) with the same load, but this was an experience best forgotten, as with three p.w. checks—at Golborne Junction, Hest Bank and Low Gill—we dropped 15½ min. on schedule, of which at least 9 min. must go against the engine; Carlisle was reached 25 min. late. The engine kept booked time to Lancaster, but Carnforth to Shap Summit alone took 55¼ min., against 43 min. booked, and the minimum speed was 16 m.p.h.

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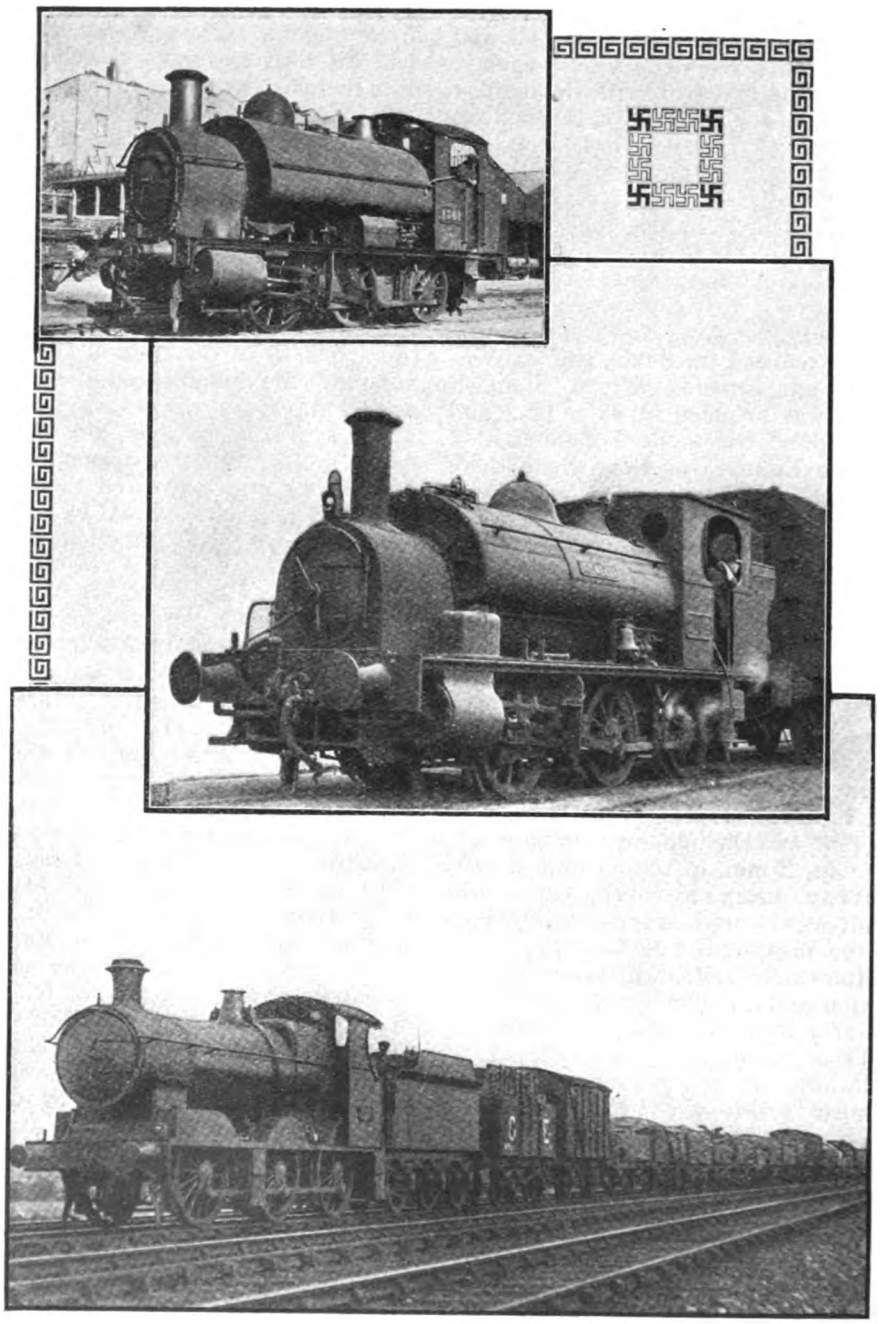

1. G.W.R. 0-6-0T No. 1361 AT MILLBAY DOCKS, PLYMOUTH. *Photo. P. Ransome Wallis.*

2. G.W.R. 0-6-0T No. 2194 "KIDWELLY" ON BOAT TRAIN AT WEYMOUTH. *Photo. A. J. Maxwell.*

3. G.W.R. 0-6-0 No. 1011 (FORMERLY M.S.W.J.R.) NEAR TWYFORD. *Photo. D. L. Rumble.*

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I have included here, as a matter of interest, the times made by the Great Western 4-6-0 engine *Launceston Castle* in the test trips of 1926 which immediately preceded the building of the "Royal Scots." It may be remarked that the load behind the G.W. locomotive was 15 tons less than that hauled by the most heavily-loaded "Royal Scot" in the table; that the "Castle" weighs 5 tons less than the rival type; and that, as coal consumption was one of the chief points of observation in these trials, the "Castle" was certainly not being driven "all out" by Young to achieve these times. Against this, the "Castle" had commenced its journey with a clean fire at Crewe, and had not worked through from Euston. In brief, with but one modest check *en route*, *Launceston Castle* gained 8 min. on booked time, or 9 min. net. A minute was gained in the ascent from Carnforth to Shap Summit. Speeds were 72½ m.p.h. at Acton Bridge, 65 through Weaver Junction, 74 at Moore, 64½ at Acton Bridge (reduced to 25 for the p.w. check), 55½ at Winwick Junction, 50½ at Golborne, 64 at Bamfurlong, 46 up Boar's Head bank, 71½ at Balshaw Lane, 64–67 from Brock to Galgate, 68 at Lancaster, and 71½ at Hest Bank, 50½ at Burton, 59 at Milnthorpe, 43½ at Oxenholme, 26½ at Grayrigg, 66 at Tebay, 20 at Shap Summit, 79 at Clifton Junction, 65 through Eamont Junction and Penrith, 70½ at Calthwaite and 71½ below Wreay; the times were thus achieved by some good sustained work throughout, and not by excessive speeds downhill. The same engine coming south, again with 415 tons, got over Shap Summit in 44½ min. from Carlisle, breasting Wreay at 36, and the 1 in 125 to Shap at 36 m.p.h.; in this case there were some high downhill speeds (including one of 86½ an hour before Tebay), and Oxenholme was passed in 60 min. 55 sec., 11 min. early! Two signal checks and two stops were experienced later in the journey, despite which Crewe was reached in 168¼ min., 7¾ min. early; net time was 157 min.—a net gain of no less than 19 min. on schedule!

In the last column may be found the return run of my correspondent behind *Royal Engineer*, on the up "Royal Scot," again ably handled by Driver Stones. Up the 1 in 132 out of Carlisle to Wreay the engine attained 34 m.p.h. with 400 tons, while up the subsequent 1 in 229—169 the rate increased to 47 m.p.h. On the level stretch through Penrith 57½ was reached, while the 6¼ miles from Clifton Junction to near Shap brought the speed down to 33½ an hour. The descent to Carnforth was interrupted by the Low Gill p.w. slowing, but some high speeds were registered, of 79 m.p.h. before Tebay, 75 before Oxenholme (reduced to 56 by a second check), 75 at Milnthorpe and 72 at Carnforth. Minimum up the short 1 in 95 bank from Lancaster was 45 m.p.h., and the maximum at Brock troughs 68. There was little of note about the remainder of the run; the actual gain on time to Crewe was 6 min., and the net gain the substantial figure of 13 min., though the timing in this direction is no less than 11 min. easier than that of the north-bound express.

Lastly, I may mention some smart running of one of the Horwich-built 4-cylinder 4-6-0 engines of the "Class 8" type, on the 8.34 p.m. up express, although with a load of only 36 axles, or 260 tons gross. We passed Wreay in 10 min. 40 sec., at 37½ m.p.h.; Plumpton in 20 min. 50 sec., having attained 50½ m.p.h. at the top of the initial climb; Penrith in 25 min. 50 sec., at 60 m.p.h.; Clifton in 30 min. 10 sec.; Shap in 40 min. 50 sec. (minimum on the 1 in 125, 34 m.p.h.); and Summit in 45¼ min.—a gain of 6¾ min. The descent to Carnforth was taken at a very moderate rate; we passed Tebay in 51 min. 5 sec., Grayrigg in 57 min. 40 sec., Oxenholme in 64 min. 55 sec., Milnthorpe in 70 min. 10 sec., and Burton in 72¾ min.; we should have reached Carnforth in 78 min., instead of the 86 min. allowed, but for a check outside, which made our time 78 min. 55 sec. From Carnforth we made another good start, passing Hest Bank in 5 min. 10 sec., Lancaster in 8 min. 25 sec., at 59 m.p.h., Galgate in 13 min. 5 sec. (having dropped to 51 at Lancaster Junction), and Garstang, 17·7 miles, in 19¾ min., at 67 m.p.h., having gained a further 2¼ min., and converted a late start of 11½ min. from Carlisle to dead time at this point. But we got two bad signal checks between there and Preston, to which we took 32¾ min., as against 33 min. allowed. At least 11 min. had been gained in running by engine from Carlisle.

An even smarter run was made by a much smaller "Prince" on the 4.15 p.m.

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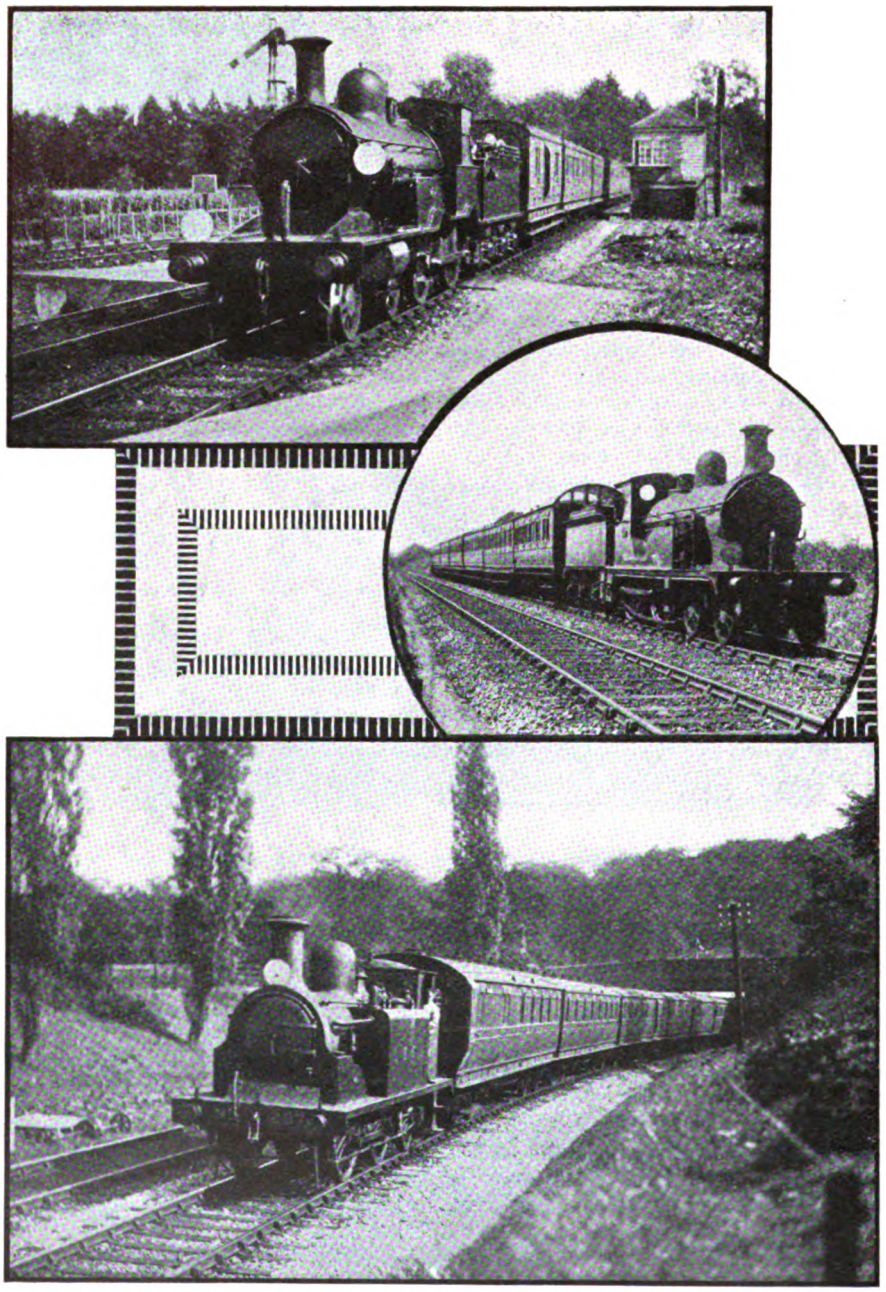

1. ROMSEY-ANDOVER TRAIN AT FULLERTON JUNCTION. S.R. 4-4-0 No. E0474 *Photo. J. E. Kite.*

2. HOLBORN CHATHAM TRAIN NEAR SOLE STREET. S.R. 4-4-0 No. A479. *Photo. L. A. Blount.*

3. UP TRAIN NEAR DORKING. S.R. 0-4-2T No. B237. *Photo. H. Gordon Tidey.*

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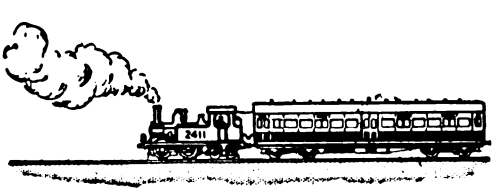
Manchester and Liverpool express from Carlisle, with a 43-axle train of 300 tons; the engine was No. 5760. We were through Wreay in the excellent time of 9 min. 50 sec., and took 17 min. 50 sec. to Calthwaite, but, as almost invariably occurs with this train, we got signals badly on at Plumpton because of the Aberdeen train, which leaves Carlisle only 10 min. ahead, stopping at Penrith. So Plumpton was passed in 22½ min., and Penrith reached in 29¾ min.; schedule time is 30 min., and our net time was not more than 26½ min. Then followed an excellent climb to Shap, passing Clifton in 7½ min., Shap in 19 min. 25 sec., and Summit in 22 min. 25 sec., instead of the 25 min. allowed. Touching 72½ m.p.h. down the 1 in 75, we passed Tebay in 27 min. 50 sec., and Grayrigg in 34 min. 5 sec., reaching Oxenholme in 41 min. 55 sec. from Penrith, though allowed 46 min. After that came a jolly sprint of 20½ min. over the 19·1 miles start-to-stop from Oxenholme to Lancaster, where I alighted; touching 72½ m.p.h. at Milnthorpe, we passed that station in 6 min. 55 sec., Carnforth in 13 min. 25 sec., and Hest Bank, 16 miles, in 16½ min. This further gain of 1½ min. from Oxenholme to Lancaster made a total of 9 min. credit to locomotive from Carlisle.

My usual acknowledgments of the many letters received were by lack of space crowded out of the last article, and in last month and this are due to H. J. Hales, S. P. W. Corbett, A. W. Bartlett, J. Brander, R. A. H. Wright, G. M. Rickards, H. J. J. Griffith, A. Mastelloni, F. Foot, C. E. W. Neat, Rev. J. H. Mortimer, A. B. Duncan, A. W. Smith, Rev. W. A. E. Westall, G. Pember, G. E. H. Roberts-Hay-Boyd, A. G. Robins, and "Moonstone"; one or two other names should be mentioned which I have for the moment mislaid. Another matter, similarly jettisoned for reasons of space, was a letter from Mr. W. K. Nash relative to the maximum loading of the "Royal Scots," on which I commented in February. He draws attention to the fact that the *maximum* load for these engines is 550 tons from Crewe to Carnforth and Shap Summit to Carlisle, and 465 tons from Carnforth to Shap Summit, on "full" load workings; 495 and 420 tons, as stated by me, on "limited load" journeys; and 450 tons over the two easier sections, on "special limit" trips. The last-mentioned are confined to the 2-hour Birmingham workings, the 3½-hour Manchester workings and the 5.55 p.m. down "Merseyside" express; the "limited load" trains cover the great majority of the Western Division express workings, the "Royal Scot" included, and it was these which I had in mind when I made the comparison with the work of the Gresley "Pacifics" on similarly-timed L.N.E.R. trains. Only the Sunday train referred to in the L.N.E.R. load notes would compare with a "full load" schedule on the L.M.S. My correspondent adds that not infrequently last summer the "Royal Scot" was made up to 477 tons from Euston to Carnforth (17 coaches) but that this necessitated the taking of pilot assistance over Shap Summit; such assistance was taken, I believe, when there was any excess over fifteen bogie vehicles on the train.

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# THE RAILWAY PORTRAIT GALLERY.

**Mr. RAYMOND CARPMAEL, M.Inst.C.E., M.I.Mech.E.,**

Appointed Chief Engineer, Great Western Railway.

MR. RAYMOND CARPMAEL, M.Inst.C.E., M.I.Mech.E., who has been appointed Chief Engineer, Great Western Railway, in succession to the late Mr. J. C. Lloyd, M.Inst.C.E., has held the position of Assistant Engineer since January 1, 1926, previous to which date he held for two years the position of Assistant to the Joint Chief Engineer, and under Mr. W. Waddell, M.Inst.C.E., at Barry Docks, was responsible for the Civil Engineering work of the whole of the Great Western Company's Docks. Between 1894 and 1899 he served with Stothert & Pitt Limited. In March, 1900, he entered Great Western Railway service in the bridge department at Paddington, and in 1901 was appointed an assistant on the Fishguard Harbour works. In 1902 he was appointed Chief Assistant. During 1907 and 1908 Mr. Carpmael served as Resident Engineer in charge of new works at Weymouth and Carmarthen. Between 1909 and 1916 he served as Chief Assistant on the Shrewsbury Division. In 1916 he was transferred to the Gloucester Division as Chief Assistant. During 1917 he was senior engineer in charge of No. 3 (G.W.R.) Civilian Railway Company, engaged in laying in and maintaining railways, sidings, yards, &c., in France and Flanders. In 1919 he was appointed Divisional Engineer at Shrewsbury, in 1922 being transferred to Neath in a similar capacity.



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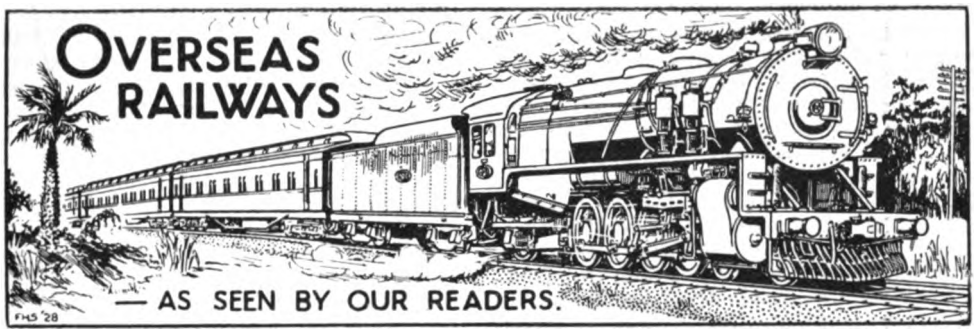


*Correspondence for this section, with or without photographs, is invited.*

**Notes on United States and Canadian Railways.**

HAVING just returned from a six months' trip on the Continent of North America, during which time I travelled some 17,500 miles on Canadian and American lines, a few comments on the December issue may be of interest. Firstly, as regards the colours of American engines, the Great Southern Railroad paint their locomotives dark green with polished brass splashers, boiler bands, &c., and the deflectors on the chimneys are cut in a zigzag pattern. Curiously enough, this line has arranged its "trade-mark," viz. S.R., in the same manner as our own Southern Railway. Secondly, your correspondent, Mr. Reeves, refers on page 471 to the gauze window screens. These are only put up in the summer months, viz. on every other window and replace the outer of the double windows which are in use during the winter. These screens cannot be moved by the passenger and let in plenty of dust if the inner window is left open.

Mr. Reeves also refers to safety devices in the U.S.A., in which connection I should like just to mention such practices as running two fast trains on the same line and in the same direction for nearly 30 miles. This actually happened to me and for the whole distance the trains were not more than half a mile apart. Another source of danger is the prevalence of allowing main lines to cross one another on the level with only the scantiest protection in the way of signals. Considerable risks are also, to my mind, taken in downhill running, especially when rounding curves and it is quite a common experience to be almost pitched out of one's chair in the observation car. The skyscraper referred to by Mr. Kerr is the new Royal York Hotel of the C.P.R. at Toronto. Mr. Ramsbottom's comments on the Trans-Canada, Ltd., of the C.P.R., on which I travelled from Montreal to Vancouver are, I think, somewhat more enthusiastic than accurate in detail!

Mr. Russell makes some interesting comments on rolling-stock on page 478, and in regard to the heating thereof, I think that the steel cars in almost universal use on the other side suffer from two defects, viz., the retention of heat in the summer and the long time they take to warm up in the winter; the steel walls also "sweat" very badly during the heating up process. Travelling across the deserts of Arizona and New Mexico in August is no joke, with the temperature at a steady 90—98 inside the cars, with very little variation at night, although the nights are comparatively cool outside.

The North American "sleeper" is certainly rather primitive, but one cannot make any comparison with conditions on this side with our one-night trips. When you are travelling on the same train for five consecutive nights, the provision of a single berth compartment for each passenger is obviously an economic impossibility and the convertible Pullman is the only solution.

Incidentally, I do not think that it is fully realised in this country that a large share of the passenger stock on North American railroads is owned and operated by the Pullman Co. In most instances the railways only operate their own dining cars and a certain number of "day coaches." You thus have, in addition to a "darkie" Pullman porter for each coach, a train conductor (supplied by the line over which you happen to be travelling and who collects the railroad tickets) and also a Pullman conductor who looks after seat and berth tickets and also supervises the "darkies" than whom, it is difficult to find a more efficient and obliging set of men.—[A. SHIRLEY.]



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**Notes on Jamaican Railways.**

THE train shown in the first photograph reproduced is that employed for the late visit of H.R.H. the Duke of York to Jamaica, and consists of a 4-8-2 Baldwin engine, baggage-van, first-class coach and the Governor's saloon, specially decorated for the Royal pair. The engine, No. 40, named *Duchess of York* for the occasion, and her sister, No. 41, were the pioneer "Mountain" type engines in the world. They have 3-ft. 10-in. drivers and 19 in. by 26-in. cylinders. The man on the engine is Chief Running Inspector Fuller, and the driver for the occasion was the senior of the service, well-known all over Jamaica as "Paddy Davidson."

The second photograph gives a good idea of the curving of a mountain railway, being of 18 deg. on a gradient of 1 in 30. I have every reason to remember the spot, as a short time ago a freight train, having stalled on the bank about a mile higher up, was divided, and on division the crew forgot to scotch the wheels or to apply the hand brakes of the detached portion, with the result that in about 15 min. after the front part had gone forward, the air-brake pressure evaporated, and the detached vehicles (three covered bogie wagons loaded with bananas) began to run back, finally coming off the road at the curve illustrated, and becoming matchwood and twisted steelwork against the rock. We spent all of a night clearing up the debris.—[J. G. B. SAMS.]

**Dinant Station.**

IN regard to my recent notes on Dinant station, I would add the further information that I think those lines which were arranged for right-hand running crossed over again to left-hand running outside the station. Possibly some other readers may have information on this point.—[E. J. NORRIS.]

**New Boston and Maine Station at Boston.**

MR. ERIC CRICKMAY sends a cutting from the *Boston Evening Transcript*, dated November 14, which contains particulars of the dedication ceremony held that day in view of the completion of the new Boston terminus then officially inaugurated. The proceedings included a dedication banquet, in which President Coolidge participated by pressing an electric button in Washington, thus turning on the station illumination and unveiling a model of the building. Mr. T. N. Perkins, Chairman of the Executive Committee of the Boston and Maine Railway, presided at the banquet, at which a special table was reserved for old-timers, consisting of four of the oldest commuters (season-ticket holders), three of the oldest conductors and the three oldest enginemen. The new station has 23 tracks and handles about 400 trains, largely main line, daily. The building generally is modelled more or less on the lines of the Grand Central terminus in New York. Mr. Crickmay also mentions that the Boston and Maine Railway has a

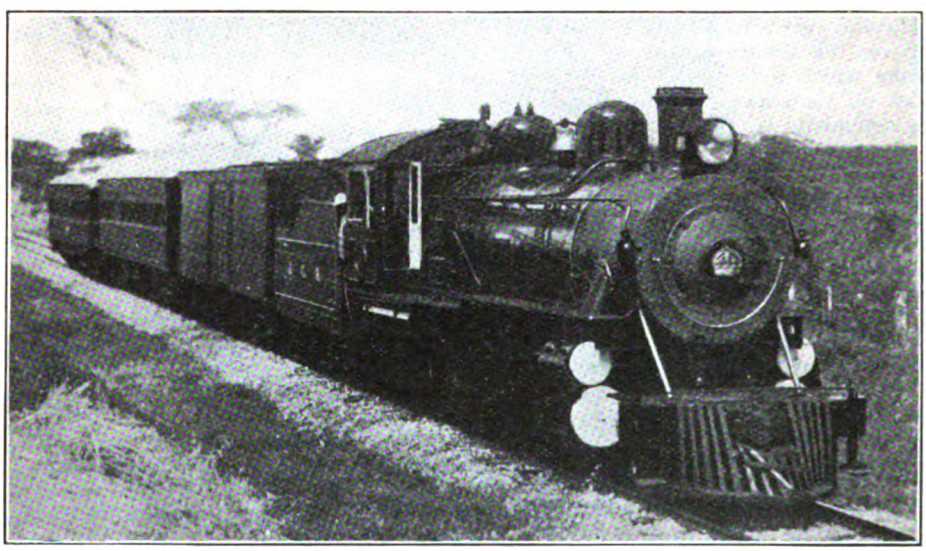

*Photo.*] [*J. G. B. Sams.*

**SPECIAL TRAIN FOR H.R.H. THE DUKE OF YORK IN JAMAICA.**

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non-stop run of 111·3 miles from Boston to Portland, for which 140 minutes are allowed. When he travelled by this train recently, with a 4-6-2 and 8 cars, half a minute was gained on schedule, in spite of five slacks, one for three-quarters of a mile, to 15 m.p.h.

**Modern Locomotive Practice in Holland.**

I TAKE pleasure to send you a photograph of one of the "graceful English-looking 4-6-0's," as your correspondent terms them, used in Holland. I must, however, correct your correspondent in so far as these engines have not only two outside but also two inside cylinders, *i.e.*, they are four-cylinder simples, all cylinders driving on the first coupled axle. They have Walschaert valve gear, the valves of the outside cylinders being moved by rocking levers from the inside prolonged valve stems. The cylinders are 15¾ in. by 26 in., driving wheels 6 ft. ⅞ in., and the boiler pressure is 170 lb. The weight in working order is 72 tons, of which 48 tons are available for adhesion. As the required speeds are not so high, the size of the driving wheels has been taken at a comparatively low figure to make them equally fitted for fast goods work. A good feature of these engines is the design of the tender, with narrow oval guards giving the driver a clear vision when running tender first. This construction left room for hinged covers in two lengths on both sides over the side water space extending the full length of the tank, thus greatly facilitating the pulling up at a water crane. The covers can be moved independently from the footplate. These tenders have a water capacity of 4,000 gallons and a coal space of 6 tons. The first twenty engines of this class are provided with large eight-wheeled tenders having a water capacity of 6,200 gallons.

*Photo.*] A STEEPLY-GRADED BRANCH LINE IN JAMAICA. [*J. G. B. Sams.*

The cabs are roomy and comfortably fitted with cushioned seats for the driver and fireman. There are backsheets with windows (visible on the photograph through the opened side window) which form a good protection from draughts and when running tender first, and doors in front giving access to the running board. There are now 115 engines of this class running, built by Beyer Peacock, Werkspoor, Hanomag and Henschel, whilst the original design was worked out by Beyer Peacock & Company in collaboration with the Dutch State Railways officials.

The remark of your correspondent that

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the speed throughout Holland is very poor, needs some further explanation, without which this mere statement would be an injustice. In Holland important stations are close together, so that long distance running, enabling any display of speed capabilities, is an impossibility. Nevertheless, the speed limit of our steam trains is 90 km. per hour, which has been raised to 100 km. for the electric trains now running between Amsterdam and Rotterdam. This may be poor in English eyes, but it is not so bad after all. It must be taken into account that the soft ground which prevails in Holland prohibits excessive speeds and the weight of the express trains often exceeds 500 tons. The longest non-stop run in Holland is from Amersfoort to Hengelo, on the express route Amsterdam to Berlin, a distance of 113·5 km. in 91 minutes, at an average speed of 75 km., about 46·5 miles per hour, or nearly the same figure as the non-stop "Flying Scotsman" with a train of approximately the same weight. The highest average speed is attained on the much shorter distance between Utrecht and Arnhem, 57 km. in 44 min., or averaging 77·8 km., equal to 48 miles per hour, over an undulating rising road with several adverse inclines of 1 in 300. The speed of the electric trains between Amsterdam and Rotterdam is higher, as said above, but as this constitutes nothing remarkable as a locomotive performance because there is nothing meritorious in "opening a cock and tapping electric energy," I will not go further into details.—[L. DERENS.]

*Photo.*] MODERN DUTCH 4-6-0 LOCOMOTIVE. [*L. Derens.*

**Notes on the Northern Railway of Spain.**

POINTING out that, with regard to Los Caminos de Hierro del Norte, his observations are based only on what he saw around Madrid itself, Mr. H. S. C. Everard writes as follows :—

"Almost all the engines stationed at Madrid are of eight-coupled types, and of these the most numerous are the 2-8-0's. These work the goods services, and occasionally take turns on the slow passenger trains; there are, however, some classes of 4-8-0's, to which the majority of the passenger services are entrusted. These are by various builders, and mostly show by their design the country of origin. Some of the finest are by Babcock & Wilcox, and were built shortly after the war. During the war America supplied some locomotives to the Spanish Railways, owing to the inability of European builders to undertake locomotive work. The reason for the size of all Norte main-line locomotives in Madrid is that all trains proceeding further than Villalba, whether *via* Avila or Segovia, have to cross the Sierra Guadarrama, and the gradients demand powerful engines, so that the '4600' class of 4-8-2 was introduced in 1925. The first of these was built in Germany by Hanomag of Hanover. I am unable to give any details, other than stating that they are, as all modern Spanish locomotives, fitted with Worthington feed-water heaters. An article in the 'ABC' (a Spanish daily newspaper) recently gives the diameter of the driving

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wheels as 175 cm., and weights as 94,320 kg. empty and 110,600 kg. in working order. Recently they have begun to build locomotives in Spain itself, and 4-8-2's of the '4600' class have been turned out by the Euskalduna Company of Bilbao, and the Maquinista Terrestre y Maritima of Barcelona. I am unable to state the number of these 4-8-2's actually at work on the Norte, but I have noted numbers up to 4625.

"As to colours of rolling-stock on the Norte, and having regard to a request in the RAILWAY MAGAZINE for notes on Continental colour styles, the following may be of interest: Locomotives—Black. Some of the 4-8-2's are lined green, but I am unable to state whether this lining is employed on all locomotives; number plates carried at base of chimney on all types having space in that position, otherwise on side of smokebox; similar number plates on tender. No special care is taken to give each locomotive its correct tender. The number plate is of brass, with background painted red. Coaches—Varnished teak. Raised brass class number screwed on (Roman figures). Old four-wheeled stock used on mixed trains is painted dark green, with class figures in gold paint. Goods stock—Red. Goods brake vans are vacuum-brake fitted, and are green. After the usual Continental custom, many of the wagons are fitted with brakesmen's cabins. There are a large number of private owner's covered vans, mostly belonging to wine exporters. These are brightly coloured (green, yellow, &c.).

"Locomotives burn briquettes, and, from the point of view of a casual traveller, appear to distribute the greater part of these on wayfarers *via* chimney. Train services are not always punctual, except in the case of expresses, which are, however, usually reliable in my experience. The varieties of trains set down in the public time-table are legion (*expreso*, *rapido*, *mixto*, *tren tranvia*, &c.). I have only once noted a case of double-heading, which was of a 4-8-0 piloting a 2-8-0 on a goods at Cercedilla, in the Sierra. It seemed to me, however, to be a trifle powerful, even for Spain!"

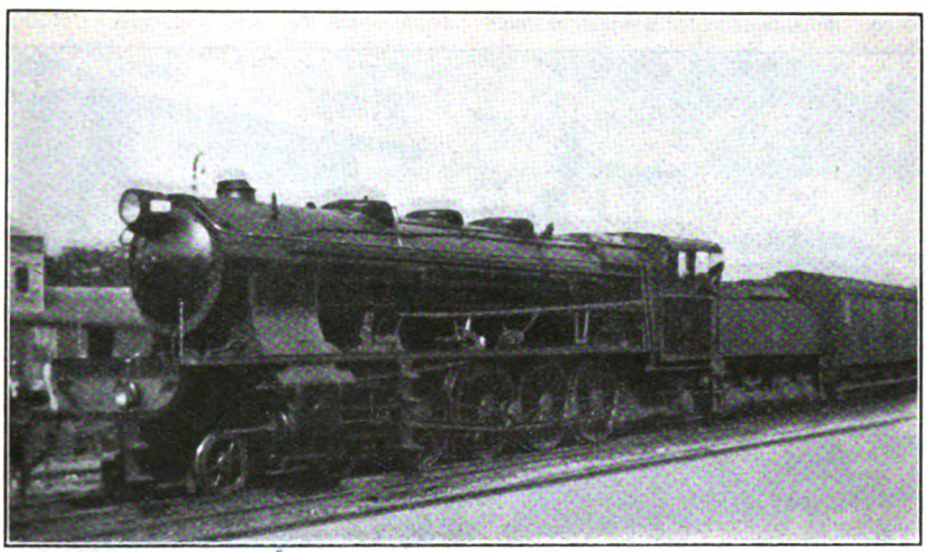

*Photo.*] [*H. S. C. Everard.*

**4-8-2 No. 4602 AT THE NORTE STATION, MADRID.**

**The Visp-Zermatt Railway.**

THE Visp-Zermatt railway connects the well-known Alpine village of Zermatt with the Simplon Railway at Visp in the Rhone Valley, and of its length of 21¾ miles, about 4¼ miles are worked on the "Abt" rack and pinion system, the steepest gradient on the rack being 1 in 8. The trains, hauled by engines similar to the one shown, usually consist of 3 or 4 coaches, and perform the journey through the magnificent St. Nicklaus valley in about two hours. In its entire length the line rises from 2,140 ft., at Visp, to 5,315 ft. above sea level at Zermatt, and the severe gradients, sharp bends and (frequently) lengthy halts at intermediate

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stations account for the time taken between termini. Hitherto the line has had to be closed during the winter, but as Zermatt is being opened out as a winter sports centre, efforts will probably be made to run trains during the sports season.

An interesting feature lies in the fact that these locomotives are named after peaks and passes in the Zermatt region, *e.g.*, Weisshorn, Lyskamm, St. Theodule, &c.

They are painted green, and the coaches red.

In addition to the rolling stock colours quoted in the December RAILWAY MAGAZINE, other colours on small Swiss lines are as follows:—Wengernalp Ry.—carriages green; Jungfrau Ry.—carriages brown; Lauterbrunnen–Murren—carriages yellow.—[J. W. B. TUNSTALL.]

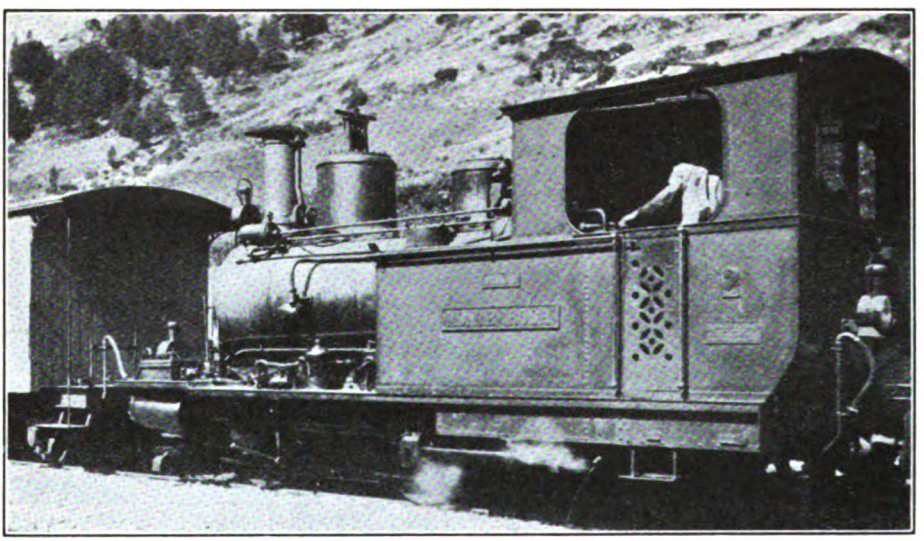

*Photo.*] [*J. W. B. Tunstall.*

**RACK LOCOMOTIVE, VISP-ZERMATT RAILWAY.**

### The Nord-Belge Railway.

THE Nord-Belge Railway is owned by the Chemin de Fer du Nord of France. This, no doubt, accounts for the French pattern of signals in use. It may be mentioned in this connection that shortly before reaching the junction of the Dinant-Tamines and Dinant-Namure lines, there is a sign, illuminated at night, showing in black letters on white, "BIFUR," in accordance with French practice. The Nord-Belge line runs from Givet (France), where connection is made with the parent system, to Dinant and Namur, making connection at both places with the Belgian National Railways. The two systems share Namur station, but whether or not this is a joint station I cannot say. Another line of the Nord-Belge runs from Charleroi, connecting with the line to Lille and Paris, to Namur and Liege (Guillemins Station). This route is taken by the Nord Express from Paris to Warsaw. From Givet to Liege the line follows the Meuse valley, in most cases alongside, or close to, the river.

Between Dinant and Namur I have seen goods trains hauled by Nord of France engines, without a rear brake van, and carrying a red disc with white rim in place of a tail-lamp by day. Presumably brake power is supplied by brakesmen riding in the small boxes found on some wagons. Many of these trains are hauled by American-built engines, and consist of high-capacity mineral wagons. The line from Dinant to Jemelle is Belgian State, and is single for the most part. The scenery of the Lesse valley, which the line follows, is reminiscent in parts of the Derby-Manchester line of the L.M.S.R.

During a journey from Dinant to Namur in May, 1927, the Nord-Belge engine, a 2-6-2 tank of German design and construction, failed. The driver and fireman, after an examination, set to work and disconnected the motion of the near side cylinder (outside). In the meantime, an official of some kind appeared on a bicycle, which he had apparently ridden along the track. A consultation took place, and the cyclist disappeared, probably to the nearest tele-

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phone. After a further wait, I heard a hoot, and saw an engine backing down towards us on the wrong line. This engine was coupled up to the disabled one, and we proceeded. The next station was a considerable depot, and apparently the first available engine had been sent to assist. This engine was a 2-8-0, belonging to the Nord of France, and was built by Baldwins, of Philadelphia. On arrival at Namur, I took a photograph of this international complication, but it was only a partial success, owing to the train standing within the station roof.

I may add that the 5-day and 15-day season tickets issued by the Belgian National Railways are available over the Nord-Belge system, or that part of it lying wholly in Belgian territory. Many of the Nord-Belge engines seem to be De Glehn compounds, at least they are very similar in appearance to those on the French line.—[H. T. L. CHAMPNESS.]

**Belgian Tramways.**

THESE are a feature of Belgian transport, and are found all over the country, both steam and electric. Goods and passenger traffic are conveyed, the latter first and second class. The lines usually run alongside the roads, stopping places being shown by a post marked on one side "Arret du tram," and on the other "Treinstilstand," together with the name of the "station." The two languages are necessary in that the majority of the population speak one language only. The system is owned by the Société Nationale des Chemins de Fer Vicinaux (S.N.C.V.), or, in Flemish, Nationale Maatschappij van Buurtsspoorwegen. A "vicinal" is a country road.

The steam engines and cars are similar in design to those of the Tramways Bretons, illustrated on page 58 of the January number, the engines being built by various of the many Belgian firms which build locomotives. The electric services are worked by motor and trailer cars of a somewhat larger pattern. The motor cars are often combined with a luggage van. There is no fixed rule as to the method of collecting the current from the overhead wire, but the bow seems to be most common. On the coast line from Ostende to Nieuport and La Panne in one direction, and to Blankenberghe, Zeebrugge, Heyst and Knocke in the other, high speeds are attained when clear of the streets in the towns. This line is electric, and the speed is naturally higher than on the steam lines, where 10 to 15 m.p.h. seems to be the average. The S.N.C.V. also operates the electric tramway services in some of the towns, Bruges and Namur, for example.

At some of the principal stations in Belgium, loud-speakers are used for announcing particulars of trains arriving and passing. I have seen them in operation at Bruges and Gand (St. Pierre). At Bruges, one speaker is used for the whole station, while at Gand one is provided for each of the 12 platforms, each one being switched in as required. Announcements are made first in Flemish, and then in French. The following illustrates the style of announcement at Gand. "'Allo! 'Allo! Le train à 9 heures 40 vers Bruges et Ostende Quai direct, voie numero douze. Attention!" This, as the train is running into the station. At Gand, too, separate platforms are provided for luggage, as at Windsor Street, Montreal.

I can confidently recommend to readers in this country a trip to Belgium and the purchase of a 15-day ticket. This ticket costs 450 fr., a little under 50s., and is available by all trains in Belgium. The price I have quoted is second class. The ticket can be obtained at any station, and, I believe, at the London office of the Belgian National Railways, with no formality other than the filling up of a form and the provision of a photograph of the holder (passport size). A deposit of 10 fr. is charged, which is returnable on surrender of the ticket on expiry.—[H. T. L. CHAMPNESS.]

**P.L.M. Locomotive Notes.**

THE new 4-8-2 locomotives of the P.L.M. have for some months been working on the hilly sections of the Paris-Marseilles line, and also between Marseilles and Nice, with the result that the winter Riviera trains have been accelerated. The fastest timing between Paris and Marseilles (St. Charles) is now 12 hr. 2 min., as against 10 hr. 25 min. in the spring of 1914. The new "Blue" trains put into service on January 15 contain single compartments only, of a design that breaks away from previous practice of the Wagons-Lit Company. Each compartment has a lavatory basin completely enclosed. The bed has been widened, and there is no upholstery attached to the partitions, so that the seat, in daytime, has the appearance of a sofa. Furthermore, the compartments are 9 in. wider than in the older models, thus affording more leg room. The decorative scheme is rather startling.—[LT.-COL. P. M. BROOKE-HITCHING.]

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RAILWAY MAGAZINE *readers desiring information should mark envelopes "Query" in the upper left-hand corner, and address them to the Editor. Questions relating to the dimensions and weights of railway rolling-stock and to names, numbers, dates, &c., of locomotives should not be forwarded. No reader should send more than two questions in one month. Correspondents are requested to write on one side of the paper only, and although they must give their names and addresses, pen-names or initials may be inserted for Editorial use. Before asking for information concerning railway history or "grouping," the pages of the "Railway Year Book" (5s. net) should be consulted. The thirty-first Annual Edition (1928) of this standard railway reference work is now published. All previous Editions are out of print.*

**Great Central 4-4-2 No. 1090.**

Mr. L. A. Fullagar writes as follows:—"G.C.R. No. 1090 was built as a two-cylinder simple, forming one of a batch, Nos. 1083–94, built by the North British Locomotive Company in 1905. It was rebuilt with three cylinders, 15½ in. by 26 in., and separate Walschaert valve gear for each cylinder, early in 1909. It was reconverted to the "1083" class about 1922. While in its three-cylinder form, it was to be seen at Grantham, on the G.N. and G.C. Sheffield expresses, which changed engines there. It may be remarked that the "1083" class Great Central "Atlantics," though overshadowed in common with most other engines of the pre-"Pacific" period by the consistent and outstanding merit of the Great Northern "Atlantics," are yet very capable engines, and still do excellent work. Mr. Cecil J. Allen has recounted some notable instances on the G.C. main line, and I have experienced, last summer, praiseworthy efforts at regaining lateness by which the through trains from the Great Western were handed over."

[Further reply to B. K. COOPER.]

**The L.M.S.R. in South Wales.**

There are so many associations between the L.M.S.R. and the different South Wales lines arising out of arrangements made between various pre-grouping companies that there must be a number of instances, besides those mentioned by you, of L.M.S. locomotives working on various portions of the G.W.R. system. There are, in fact, definite running-power arrangements to Cardiff, Newport and Swansea, as you will see from the L.M.S. map in *The Railway Year-Book*. The train noted by you is probably an example of the working of an engine and van coupled to a mineral train to enable the combination to be worked as one train and thus reduce track occupancy, both requiring to proceed to the same place or to cover a portion of the same route at approximately the same time. This procedure is not infrequently adopted with goods and mineral traffic.

[Reply to "TALISMAN."]

**Automatic Intermediate Signals.**

There are a number of places, not only on the Great Eastern section but elsewhere, where intermediate signal-boxes are being removed and automatic signals installed through a section a few miles in length. In such cases the block sections are not extended, in that the automatic home signals constitute the block sections. Hence, train working should be expedited rather than hindered, though procedure has to be somewhat more elaborate in the event of breakdown or failure of a signal. Normally, however, such installations are entirely advantageous, in that it is only very exceptionally that anything goes wrong. There is no reason to



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attribute the delays indicated by you to the fact that such signals have been installed on the section noted.

[Reply to A. C. H.]

**Building Locomotives.**

The time occupied and the cost depend, of course, upon the type of engine, how many are built simultaneously, whether the works are concentrating on these engines or dealing with them concurrently with much other work, and further factors, such as the extent to which standard boilers and other parts which can be taken from stock are utilised. An engine may thus be turned out in two or three months, or its construction may extend over a year or more, while cost depends entirely upon the type and size of the engine and the extent to which it includes special features.

[Reply to J. L. MAWHOOD.]

**Solway Viaduct.**

The line which passes over the Solway Viaduct is the Solway Junction Railway. The company was incorporated by Act of June 30, 1864, to construct a line from the Caledonian Railway near Kirtlebridge, to the Brayton station of the Maryport & Carlisle Railway, and certain branches in connection therewith. The viaduct was closed in the early part of the war period and has not since been re-opened. Details of this line were given in a "Pertinent Paragraph" on pages 66 and 67 of the January, 1927, issue of the RAILWAY MAGAZINE to which we may refer you for further particulars.

[Reply to C. TAYLOR.]

**448 Miles Non-stop.**

We have, on several occasions, referred to this record run, made about 50 years ago in the United States to convey a theatrical party. It was, of course, arranged as a "stunt" and involved provision for supplying coal from the baggage wagon to the engine and the use of relieving enginemen, while the train was a very light one.

[Reply to T. W. LINSELL.]

**The Smallest Main-Line Train Service.**

We believe you are correct in assuming that the Highland section of the L.M.S.R. between Helmsdale and Georgemas Junction has the sparsest train service of any main line in Great Britain.

[Reply to T. W. LINSELL.]

**Edenderry Branch G.S.R. (I.).**

A Dublin correspondent writes: "For your information, I beg to state that the following appeared in the 1876 issue of 'Bradshaw's Railway Manual': 'By Act of 30th June, 1874, the Company was authorised to construct a Branch, 9 miles in length, from Enfield to Edenderry.'" Mr. H. M. Comber mentions further that the branch was opened on April 9, 1877.

[Further reply to C. J. COGHLAN.]

**G.W.R. Locomotives.**

Mr. F. W. Brewer writes:—"Although, as stated by me in the January number (page 54), the Monmouthshire Railway & Canal Company was not acquired by the G.W.R. Company until August 1, 1880, the last-mentioned company had worked the concern as from August 1, 1875."

[Reply to C. WHITTON.]

**Proposed Route of L.D. & E.C. Railway.**

It was originally intended that the L.D. and E.C. Railway should be extended from Macclesfield through to Warrington. The route selected was *via* Buxton, Macclesfield and Knutsford to Warrington (Ship Canal). We cannot say anything as to your further enquiries.

[Reply to R. T. NINNIS.]

**Ivatt and Marsh "Atlantic" Engines.**

Mr. K. C. Davis points out that the earlier "Brighton" 4-4-2's, now superheated, and with cylinders 19½ in. diam., have a tractive effort of 21,130 lb., a higher figure than that of the later engines built with superheaters. The engines, however, still retain their slide valves.

[Further reply to A. J. SHAUGHNESSY.]

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**The G.W.R. at Victoria Station.**

Both the G.W.R. and the L.M.S.R. still have running rights into Victoria station, and these are maintained for milk, horse-box and other traffic, though most of the passenger-train services at one time operated have disappeared.

[Reply to "WEMBLEY."]

**G.W.R. "King" Class Locomotive.**

We have published the only information which has been made public as to detailed dimensions of these engines, and are, therefore, unable to give you the further details asked for by you.

[Reply to K. C. DAVIS.]

**New Southern Railway Locomotives.**

We have already indicated that the new "Schools" class of three-cylinder 4-4-0 engines are intended for services from London to the coast which do not require 4-6-0 locomotives.

[Reply to J. A. T.]

**Pullman Cars.**

Pullman cars were at one time used on the London and South Western Railway, but there has been no suggestion of which we are at present aware of re-introducing them on Western Section trains.

[Reply to "CRYSTAL PALACE."]

**Rebuilt Locomotives, S.R.**

One or two Drummond 0-6-0's and many 4-4-0's have been rebuilt in a distinctive manner. The Drummond 4-6-0's have, however, mostly been replaced by "King Arthur" engines.

[Reply to "SIR GILLEMERE."]

**Canterbury Connecting Lines, S.R.**

The line mentioned by you was, we believe, laid to meet war traffic requirements. It is, we understand, used for exchange purposes, though not for regular running.

[Reply to H. DIXON HEWITT.]

**L.N.E.R. Locomotives.**

None of the "Shire" class 4-4-0's are to our knowledge compound. We understand that the new G.E. type 4-6-0's are painted green.

[Reply to "WIZARD OF THE MOOR."]

**Grafton Curve, G.W.R.**

Mr. P. R. Gale mentions that this curve was authorised by the G.W.R. Act of 1904, and was opened on September 6, 1905.

[Reply to J. A. T.]

**"Royal Scot" Loads.**

Maximum load permitted to engines of this type over Shap Summit is 420 tons, and this accounts for the piloting you have noted. [Reply to W. RAWCLIFFE.]

**The "Royal Scot," L.M.S.**

On the up journey, the two portions of this express are united at Symington, thus reversing the down journey procedure. [Reply to G. C. WILSON.]

**Routes for Doncaster Traffic.**

We cannot deal with routes adapted to meet occasional conditions. These may, moreover, vary within a few hours.

[Reply to R. H. DANE.]

**Pollitt 4-4-0 Engines, Great Central Railway.**

We believe that the bulk of these engines carry boilers pressed to 180 lb. per sq. in.

[Reply to E. BURY.]

**Savernake-Marlborough Branch, G.W.R.**

It is reported that this branch is to be closed as suggested by you. No other details are yet available.

[Reply to J. A. T.]

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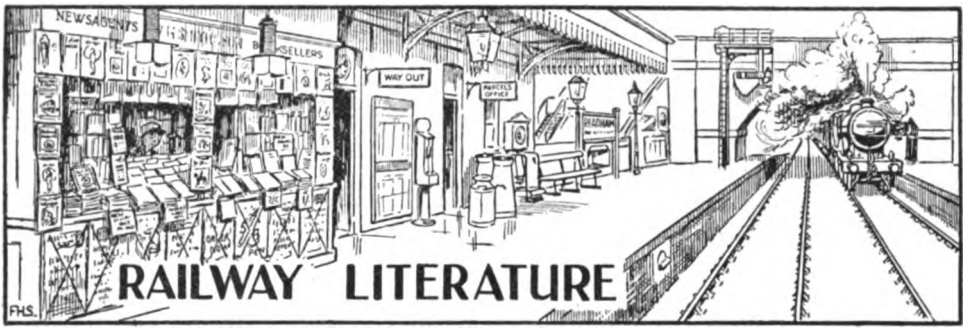


REPORT OF THE BRIDGE STRESS COMMITTEE. Department of Scientific and Industrial Research. [London: H.M. Stationery Office. Price 18s. net.]

This important document occupies a large volume amply illustrated by diagrams and photographs. It has an admirable introductory note by Lord Balfour, as Lord President of the Council, and a useful synopsis is prefixed to the Report, which occupies 215 folio pages.

This work marks an epoch in railway engineering. A great advance towards the solution of an intricate problem has been made by gathering together, under the auspices of a Government Department, railway engineers, civil and mechanical, scientists trained in research, and others able to contribute towards the common aim. Under the able chairmanship of Sir Alfred Ewing, the members of the committee have worked together for over five years, during which time they have carried out a full series of tests on railway bridges, small and large, with engines of different types.

The report, which is of considerable length, contains a description of the methods of testing adopted, sets out the conclusions to be drawn from the tests, and proceeds to enumerate a new method of calculating impacts effects which is primarily the work of Prof. Inglis, of Cambridge University, a prominent member of the Committee.

It is evident, even from a superficial reading, that the work of this committee has already had, and is likely to have, a considerable influence on the design of locomotives as well as on the design of bridges. One gathers from the section of the report which deals with the balancing of locomotives that the committee has found that there is considerable room for improvement in the methods adopted in this direction, and we are given to understand that already their work has borne fruit. It is not too much to say that it was as a direct result of their inquiries into the possibilities of reducing the "hammer-blow" of modern high-powered locomotives that the four main railway companies have been enabled to put into service locomotives of greatly increased power with axle loads which would hardly have been permitted a few years ago.

This has been possible owing to the considerable limitation of "hammer-blow" which is found to be the usual result of constructing engines with three or four cylinders. In the L.M.S.R. "Royal Scot," G.W.R. "King," L.N.E.R. Pacific (enlarged) and S.R. "Lord Nelson" classes, axle loads of over 20 tons are combined with such a small dynamic increase due to "hammer-blow" that the resultant rail pressure at high speed is no greater than that of earlier engines whose nominal axle loads are considerably less. That these improvements have been made during the committee's term of work is due largely to the assistance of Sir Henry Fowler, chief mechanical engineer of the L.M.S.R., who became a member of the committee shortly after its formation with the express object of strengthening that body on the locomotive side.

It is gratifying also to note that considerable economy may be expected both in the design of new bridges and in the cost of renewal and strengthening of existing bridges. Increased knowledge of the cause and extent of impact tends to greater confidence in dealing with the problems of bridges supposedly overstressed, and by providing a sounder means of discrimination, enables unnecessary expense to be avoided. *The Railway Gazette* for February 1 gave an account of the origin and personnel of the committee and of the engineering staff attached, and on another page we print a short summary of the report.

SOUTHERN RAILWAY POSTERS. The Southern Railway Company has issued two very attractive winter and spring coloured posters. The former shows a typical leisured class group basking in the sunshine of some earthly Paradise "where winter is wonderful"—presumably the Riviera; whilst the latter depicts a mass of glorious spring flowers, charmingly tinted, with the legend



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—"Greet the Spring with 'Go-as-you-Please' tickets (half fare): Day Ticket Programme at any Station on the Southern Electric."

Copies of two further posters issued by the Southern Railway Company are also to hand. One of these is a gaily-coloured picture of Broadstairs, the letterpress of which assures the prospective visitor that he can get there by frequent expresses and cheap fares, and urges him to obtain a copy of an illustrated guide thereto, price 2½d., from the Clerk to the local Council. The second poster is a letterpress design relating to day outings, and intimating that parties of eight, or more, can "go single fare for double journey" on the Southern Railway.

GREAT WESTERN PORTS, 1929. This handbook is produced and published by H. N. Appleby, by arrangement with the Great Western Railway Company. It is remarkable for the conciseness of its letterpress, its many fine illustrations, the artistic and clear way in which it is produced, and the art paper on which it is printed. This year the handbook runs to 328 pages, and there is, besides, a 59-page advertisement section. The frontispiece shows portraits of Viscount Churchill, Chairman, Great Western Railway; Sir Felix J. C. Pole, General Manager; and Mr. Charles S. Page, Chief Docks Manager. A folding coloured map is placed before each of the dock areas described, and in addition there is a coloured inset dealing with the South Wales Seaboard as a whole, and a fine large map of the Great Western Railway system. In the "Foreword," stress is laid on the fact that vessels changing from one specified port to another in South Wales are liable for only one tonnage due on the net register tonnage, plus a nominal locking fee; "this," it is added, "gives to the South Wales ports a new and unique advantage."

PENNSYLVANIA RAILROAD COMPANY. This wall calendar is of generous dimensions, and the greater part of it shows a front-end view of a locomotive—No. 5400—with a couple of aeroplanes well in evidence on the right, one in the air and the other near the track. The title of the picture, which is coloured is "Harnessing the Plane to the Iron Horse." Immediately beneath is a sectional view of the United States, showing the course of the railway from ocean to ocean. Below this, again, is a long three-month tear-off strip, boldly printed in red and blue-black on a tinted background. A protecting sheet which accompanies the calendar gives an interesting account of the Pennsylvania Company's new coast to coast rail and air service, whereby two days are saved on the trip—"a trip made in comfort and luxury."

"UNDERGROUND" RAILWAYS.—This takes the form of a tastefully-designed booklet, part calendar and part "appointments" diary, spaces being allotted against each day for morning, afternoon and evening entries, one week to the page. Interleaved are many charming illustrations of famous masterpieces of paintings, photographic reproductions of London life, country scenes, &c., and a facsimile of the original MS. of the National Anthem, by Dr. Arne. Appropriate letterpress accompanies the various reproductions. The book is artistically bound, and measures 6¼ in. by 9⅛ in. by ½ in.

OMNIBUS LIGHTING AND STARTING. By J. W. Houghton, A.M.I.E.E. [London: Fanfare Press, 112, St. Martin's Lane, W.C.2. Price 2s. 6d. net.]

This little handbook is devoted to a survey of the principles governing lighting and starting equipment for omnibuses, and the practical considerations which should influence its selection. The author commends the constant voltage dynamo system. There is also a useful section on the anti-dazzle problem.

THE Wimbledon and District Model Railway Club send a copy of their calendar for 1929, prepared, as usual, by Mr. C. F. Klapper, of 4, Wellington Road, Bow, London, E.3, who sends also one of his own monographed calendars. These are very good examples of complicated and more elaborate monographic work, of which he makes a speciality. Hence his business slogan, "The heaviest loads at maximum speed," as suggested by an illustration of a modern heavy express passenger locomotive.

MESSRS. G. AND J. KITCAT LIMITED, of 14–20, Shand Street, London, S.E.1, send specimens of Ledura bindings in various colours, this being the name they have adopted for the new style of binding which they have recently introduced as two-colour shaded embossing. The firm point out that Ledura binding is a purely British product, and has been developed exclusively by themselves.

MR. W. G. TILLING, of the firm of Richard Tilling, 106, Great Dover Street, London, S.E.1, sends a useful block calendar for 1929, also a wall calendar.

MESSRS. ALF. COOKE LIMITED, of Leeds, printers of our large engine colour plates recently issued, send a useful wall calendar.

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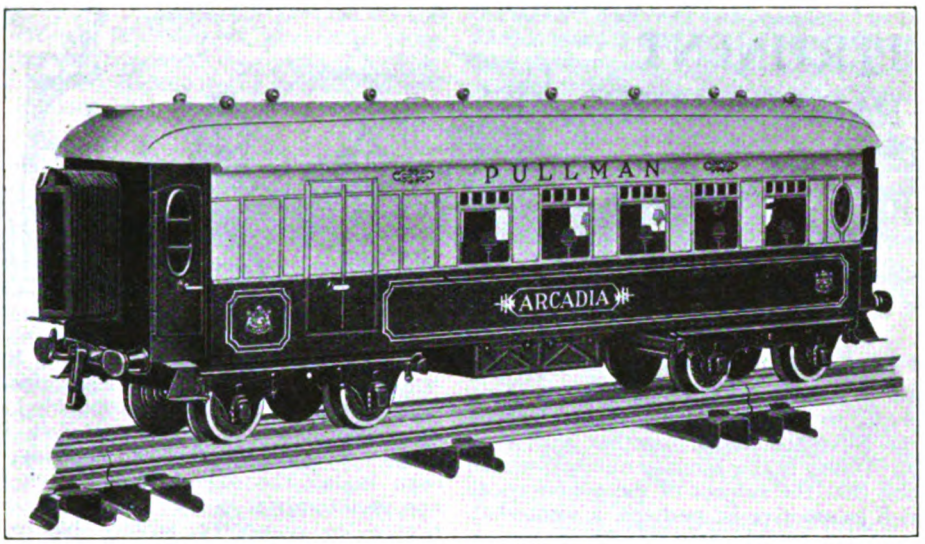


**HORNBY MODEL PULLMAN COACH.**

MECCANO LIMITED, of Liverpool, send a sample model of a Hornby Pullman coach. It is explained that hitherto Hornby train products have been built to free-lance designs. In future programmes, however, it is proposed to introduce models built as far as possible to scale proportions, and the new type of No. 2 Pullman car and composite are the first of these "scale" products, and the makers are to be congratulated upon the results achieved.

The coaches are made from tinplate and are enamelled in the correct standard Pullman Car Company's colours. Details, such as scale ventilators to the roofs, are fitted, and all doors are made to open and have scale door handles, special care having been taken to make these as neat as possible in appearance. Transparent windows with imitation shaded table lamps printed on them give the coaches a most realistic appearance. The equalising bogies are enamelled black, and each of the cast-metal white-rimmed Mansell wheels revolves separately on the axles, that in turn run in miniature axle boxes. The fitting of these bogies gives a coach extremely smooth running qualities. One corridor connection and one detachable vestibule door are supplied with each coach.

STEAM HEATING.—A complete description with explanatory diagrams of the Westinghouse system of train heating is embodied in a well produced brochure recently issued by the Westinghouse Brake & Saxby Signal Co. Ltd., of 82, York Road, London, N.1. Among the advantages claimed for this system which uses steam at atmospheric pressure, are constant temperature of steam in heaters automatically maintained, even temperature irrespective of train length, economy in steam secured by automatic cutting off supply when correct temperature has been reached, and rapid heating up from cold; elimination of freezing risks and low installation costs.

ALF. COOKE LIMITED, Colour Printers, Leeds and London, send a colour print, beautifully produced by the "Crownprint" process, of the original engraving of Francis Wheatley's famous picture, "The Schoolmistress," now in the British Museum.

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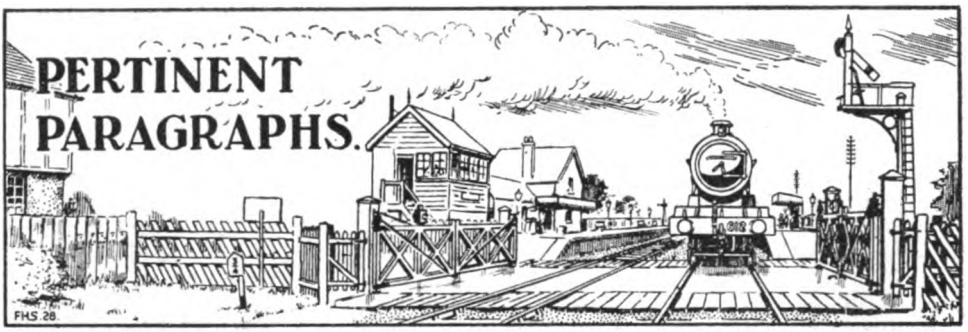


**The Appearance of Locomotives.**

MR. E. LITTLE writes as follows :—" With reference to the contribution by Mr. Derens in the November issue, together with that by Mr. Davey in the January number, whilst feeling that the subject of the symmetrical British locomotive is, perhaps, a somewhat difficult one on which to touch, yet one is constrained to join issue with these two writers in emphasising their plea for the maintenance of a neat outline in the large engines of to-day.

" It can hardly be denied that on certain lines there has been a grievous falling away from the handsome appearance common to the engines of bygone days. Mr. Derens draws attention to the wind deflectors as fitted to the ' King Arthurs ' on the Southern Railway, whilst Mr. Davey speaks of the former stove-pipe chimneys on the early Holden engines on the Great Eastern Railway, but these instances of ugliness are easily outstripped by that hideous stove-pipe chimney with deep capuchon inaugurated during the Urie régime on the London and South Western Railway, and perpetuated even to-day. It must, indeed, be difficult for the lay mind to understand how it ever became necessary (on the score of economy or otherwise) to so distort the appearance of those very neat 4-4-0 engines of the late Mr. Drummond's ' 702 ' class when the time arrived for rebuilding them with superheaters. Whilst such chimneys may be in keeping with the Nord engines in France and other Continental types, they are wholly out of place on the smokebox of a British locomotive.

" Symmetry of boiler outline departed from the Caledonian Railway express engines after Mr. McIntosh's day, his successor introducing a particularly clumsy-looking type of snifting valves, which, with a short chimney, as in the three-cylinder 4-6-0 engines, were practically of the same height. Possibly neatness, simplicity and elegance of design was never brought to a higher plane than in the McIntosh 4-4-0 ' Dunalastairs,' especially those of the second and third batches, *i.e.*, the ' 766s ' and the ' 900s.' More than one writer has awarded pride of place in the matter of unquestionable handsome appearance to the defunct 7 ft. 8 in. Singles on the Great Western Railway, and even to-day the express engines on that line would appear to hold the premier position as to symmetry, largely due to the built-up chimney with the copper top, the brass safety valve casing and, in the case of the ' Castles ' and ' Kings,' the brass beading to the splashers and other embellishments."

**The L.M.S.R. and Nottinghamshire Coalfields.**

IN connection with the development of the Nottinghamshire coalfields, the L.M.S.R. has in hand a scheme of a far-reaching character for the improvement of the transport facilities of the area. When completed, the scheme, which will cost £200,000, will give Nottinghamshire collieries a modern and expeditious transport service, and should help considerably the welfare of the coal industry in the district.

A new loop line at Kirklington has already been completed, and the opening (on January 3) of a new £60,000 branch line to Welbeck Colliery marks a further definite stage in the progress of the scheme. The new branch, which is some three to four miles long, leaves the Mansfield and Worksop line at a point about half a mile north of Shirebrook station, and now gives direct access to the colliery.

Further works which are under construction include a new marshalling depot near Shirebrook, for the sorting and despatch of traffic from various collieries in the district (including Welbeck), the doubling of railway between Upton Crossing and Rolleston West Junction, a new West Curve at Rolleston connecting the Mansfield and Southwell line with the Lincoln and Nottingham line, additional siding accommodation at Mansfield Colliery Sidings and Rufford Colliery Sidings, and extension of loop at Farnsfield. These works will enable southbound traffic from



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the Mid-Notts collieries to be worked *via* the new curve at Rolleston, an advantage being that heavier trains can be operated by this route than *via* Kirkby owing to more favourable gradients.

**Unusual Restaurant Car Services.**

MR. E. J. NORRIS writes :—" Referring to the changing of a restaurant car at Achnasheen, I may add that a similar method is adopted between Waterloo and Brockenhurst on the 12.8 p.m. Waterloo to Weymouth, and the 2 p.m. Weymouth to Waterloo. The car arrives Brockenhurst 2.5 p.m., returning at 3.30 p.m., due Waterloo 5.29. The trains referred to run only during the summer service, and until last summer this method of working was in daily use during that period. Last summer the car went through to Weymouth on Saturdays only, another car working the 2 p.m. through from Weymouth to Waterloo. Another interesting working (Saturdays only) was 12.15 p.m. Waterloo to Lymington Pier, returning after about half an hour turn-over time, due Waterloo 5.25. In this case, the whole train worked in this way, as well as the restaurant car. The 12.15 p.m. train was not shown in the public time-table though the return train was shown."

**Coast Erosion and an Irish Railway.**

MR. C. J. COGHLAN sends the following notes :—

" No railway in the British Isles suffered to the same extent from coast erosion as the late D.S.E.R. The best part of the line from Dublin to Wicklow (28 miles) runs along the coast, at some parts being just beside the shore. From Merrion to Kingstown the line runs just beside Dublin Bay, but this section has never given much trouble; it is protected by a strong wall. The rails of the old Dublin and Kingstown Railway were laid on granite blocks, and when wooden sleepers were introduced, most of these blocks were used in the construction of the protecting wall.

" On emerging from Dalkey tunnel the line immediately begins to run along the cliff over the sea till Killiney station is reached. The section between Killiney and Bray suffered very severely until the line was diverted, as mentioned later. At the time of construction the line was built a good distance from the shore, and passed over the site of a military encampment, traces of which may still be seen. On the sea side of the line the railway company were compelled by the Board of Ordnance to make a road from Killiney to Bray giving access to the several Martello towers along the coast; this road was completed in 1857. At this point it may be of interest to mention that the company had to construct a dock at Bray for the Admiralty at the same time, which was filled in when the harbour was built in 1888. Many people in a position to judge think that it was a great mistake to construct the line from Killiney to Wicklow along the coast as it was. They think that it should have run inland to the eastward of Bray, through Kilruddery demesne to Delgany, and thence to Wicklow. It is whispered that the reasons this course was not taken was, firstly, the engineer, I. K. Brunel, wished to display his skill in constructing the line round Bray Head; and secondly, that the then Earl of Meath, not wishing to have the railway run across his estate, gave the land round Bray Head free. The railway to Bray was opened for traffic on July 10, 1854.

" The Bray Head contract was three miles in length, and cost £63,187, land and compensation costing £5,500. Work was begun in 1848 and finished in 1854. Three tunnels were constructed, and in 1859 it was found necessary to build two strong sea walls round the Head at points most exposed to the sea. From Greystones to Wicklow the line followed the seashore all the way, and the section was opened on October 29, 1856.

" On August 9, 1867, the morning train from Enniscorthy hauled by a 2-4-0 tender engine—No. 12, built by Fairbairn—ran off the rails round Bray Head at the stop known as the Ram's Scalp; only one life was lost. The train fell on the inland side of the line, not into the sea, as most people believe. This accident was found to have been due to the severity of the curve at this point, and the company were obliged to move the line further in, necessitating the construction of a new tunnel, which was completed in 1875. At points near Killiney and Greystones it was found advisable to move the line 10 ft. or more in not many years after the line was completed, and in 1889 an extensive diversion was found necessary just north of Greystones. Slowly but surely the sea encroached, engulfing the military road and one of the Martello Towers between Killiney and Bray, and by 1900 the railway company was compelled to build a strong wall with buttresses at some points at the foot of the cliff, but the forces of nature prevailed against the cleverness of the railway engineer, and on several occasions before the line was finally abandoned the protection walls were broken during storms, and the train service had to be suspended.

" In 1903 the company obtained Parliamentary powers for a scheme of diversions between Killiney and Bray and between Bray Head and Wicklow. Owing to the



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bad financial condition of the company, nothing was done until June, 1913, when Naylor Bros., of Huddersfield, the contractors, began work on the new tunnel round Bray Head, 1,100 yards long; the Bray–Killiney section was commenced later. This section was opened for traffic October 10, 1915, and runs about one-third of a mile inland from the old line; it was to have been completed earlier, but the shortage of labour on account of the war delayed it. At the present time the sea has in several parts demolished the protecting walls and eaten into the land, engulfing entirely the old line. In April, 1916, Messrs. Naylor gave up the Bray Head contract, and Mr. Wm. Henn Hinde, of the firm of Hinde & Cleeke, took up the work, which was completed and opened for traffic on December 17, 1917. Nothing has been done in connection with the Greystones–Wicklow section up to the present, but the line is in a precarious position, and sooner or later will have to be replaced. It is at present largely protected by reinforced-concrete blocks chained together."

**Locomotive Nicknames.**

AN Ipswich reader notes the following nicknames applying to late Great Eastern engines:—0-6-0T (class "J 65"). "Buck-jumpers"; 2-4-2T (class "F 7"), "Crystal Palaces," or "Greenhouses," due to large side window cabs; small 0-6-0T (class "J 15"), "Stones," reason obscure; 2-4-0's (class "E 4"), "Intermediates."

**A Dog-Power Railway.**

RUNNING north from Nome, Alaska, for about 80 miles across Seward Peninsula, is the most remarkable railroad in the world. Of ordinary narrow-gauge construction, it was built between 1900 and 1906 to carry supplies to the mines north of Nome; 20-lb. rails were laid on ties placed across slabs piled on the tundra. Proper ballasting was impossible in most places, and knuckle-jointed locomotives were used to overcome the unevenness of the track. By 1911 the richest and most productive gold deposits on the peninsula had been worked out. There was not sufficient traffic for the railway and service was discontinued. The locomotives and cars were allowed to gather rust on sidings, and for years the track lay neglected in the tundra grass. But not entirely neglected. Dog drivers built some flange-wheeled cars, and to-day the abandoned track is a well-travelled thoroughfare. The dogs supply the motive power. With a half-dozen dogs, two men can make 40 or 50 miles a day with ease. With more dogs, and travelling slower, considerable loads of freight can be transported. Two years ago the territorial Government bought the line and right-of-way, and it is now being put in repair especially for the use of dog teams.—From the *Railway Age*.

**The Shepreth Accident.**

COLONEL A. C. TRENCH'S report to the Ministry of Transport in regard to the level crossing accident, on August 17, in the vicinity of Shepreth station, L.N.E.R., has been issued. The 10 a.m. express passenger train from Cambridge to King's Cross was approaching Shepreth station at a speed of 55 to 60 m.p.h., when a motor lorry, laden with lime, attempted to cross the level-crossing immediately in front of the train. The engine struck and demolished the motor lorry, but was itself derailed by the collision, as were also five of the six vehicles comprising the train. The fireman of the train was killed and the driver of the lorry died in hospital within a few hours. The engine-driver was injured and badly scalded by escaping steam, and the guard and 21 passengers suffered from injuries and shock, one passenger being detained in hospital. The train was drawn by a 4-4-2, No. 3253. Colonel Trench expresses the view that the existing exit from the Cement Works on to the crossing is not suitable for heavy lorry traffic and that the sleeper track, &c., should be widened. He also repeats and endorses the recommendation of the Coroner's Jury to the effect that it would be advisable if the East Anglian Cement Company would introduce some system whereby their own customers could be piloted over the crossing. Further remarks included the following comments:—

"This accident draws attention to a risk which has only arisen within the past few years in connection with level crossings, *i.e.*, the risk of the road vehicle derailing the train. Before the recent growth of heavy road transport, it was reasonably probable that an individual, who, by neglect of proper precautions at a level crossing, was involved in an accident, endangered his own life or the lives of his own passengers only; the case of traction engines and the few similar heavy vehicles was covered generally by Railway Clearing House Rule 120, which prescribes special precautions to be taken by a station master on receipt of notice from the owner that such vehicle would be traversing an occupation crossing, or a public crossing not provided with fixed signals. Such occasions were few, and the vehicles were usually owned locally.

"The position is now altered, and it is evident that carelessness on the part of

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drivers of heavy road vehicles may cause serious risk of a train accident involving a number of lives. Two other cases of passenger train engines being derailed by lorries at similar crossings have occurred recently. There is also a very large and increasing number of cases of motor vehicles colliding with, and sometimes breaking through, the closed gates of public road level crossings. As in almost all the latter cases, I understand that the railway company obtains payment from the motorist for the damage done, it is a reasonable assumption that the accident is due to negligence on the part of the motor drivers.

"In the event of the continuance and increase of similar accidents due to neglect of reasonable precautions on the part of drivers of road vehicles, it will be for consideration whether additional safeguards in the interests of railway passengers should be provided, and by whom they should be provided, since it is evident that the general substitution of bridges in place of level crossings, at all events at occupation crossings, will, from financial reasons, not be practicable for an indefinite period.

"Having regard to the speed and other circumstances, the absence of telescoping and the small casualty list were very remarkable, and in my opinion this can be attributed largely to the construction of the twin articulated coaches, the two halves of which are close coupled over their central bogie by a knuckle and pin coupling, which restricts relative movement between the underframes in both vertical and lateral directions. Neither of these couplings was broken."

**Marking of Signal Arms.**

MR. W. E. GUEST, of Oswestry, sends the photograph reproduced, showing the down starting signal at Llwyngwril station, on the Central Wales division (late Cambrian) of the Great Western Railway. This is sent in view of remarks published in the December number. Mr. Guest writes as follows: "This gives a clear indication of the white circular spot in place of the white vertical stripe on the red face of the signal. The signal is a standard Cambrian type, and there were many similar throughout the Cambrian system. They are now becoming scarcer as the G.W.R. process of standardisation advances. The marking of the signal arm appears to be identical with that of the late Midland Railway mentioned by Mr. Abdey. The back of the arm was marked in the same way as that of the late Midland Railway, viz., a black circular spot on the white arm. As far as I am aware, the Cambrian Railway did not depart from the usual practice in the marking of distant signals. I should be glad if your journal could enlighten me as to the origin of this marking of signal arm and the significance of it, if any."

**Re Single-Driver Locomotives.**

MR. H. A. MURRAY writes:—"Your correspondent, Mr. H. C. Casserley, is not correct in including 'three 2-2-2 tanks on the Waterford and Tramore section, G.S. Railways, Ireland,' as it was stated on page 256 of the September, 1928, issue, that No. 2 of that section (G.S. Railways No. 484) had been scrapped; the other 2-2-2 tank No. 4, was withdrawn several years ago, so that No. 1 is the only Irish 'single' left. A photograph of No. 2 was given in the RAILWAY MAGAZINE of May, 1926, page 407. These engines were constructed in 1855 by the firm of Wm. Fairbairn & Sons, whose numbers were 55 and 56. They had 13 in. by 18 in. cylinders, 5 ft. driving—and 3 ft. 6 in. leading and trailing wheels, the wheelbase being 13 ft. No. 1 was rebuilt in 1896 and 1925, No. 2 in 1897 and 1926. The design was a standard of the makers, and a number of examples built for the

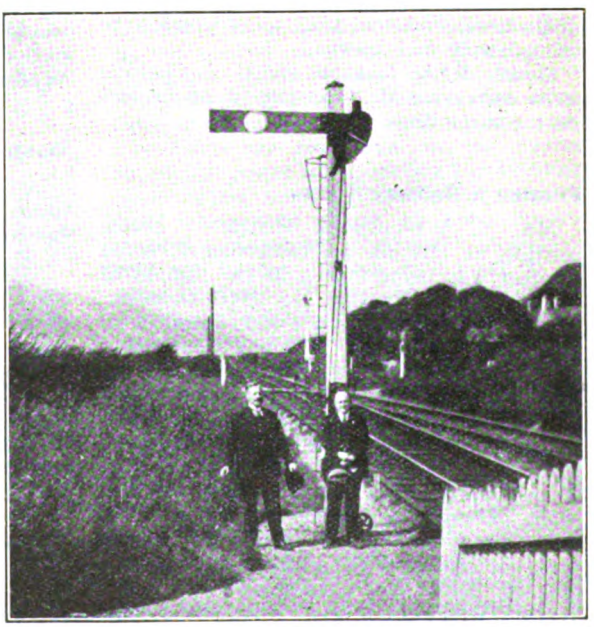

*Photo.*] [*W. E. Guest.*

**LLWYNGWRIL STATION DOWN MAIN STARTING SIGNAL.**



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D. W. & W. Railway were described by Mr. E. L. Ahrons in the February, 1926, number. Those of the latter line, and of the M.G.W. Railway, were all scrapped early in this century.

"The W. & T. Railway No. 4 was a Bury, Curtis & Kennedy engine of the 2-2-2 tank type, which had, I believe, been used by the contractors for the line; it was originally built for the 4 ft. 8½ in. gauge, and might have been a tender engine. It had cylinders 13 in. by 18 in., and 4 ft. and 5 ft. 7 in. wheels; in 1867 it was rebuilt with a domed boiler. The D. & S. E. Railway scrapped their last 2-2-2 tank in 1923, No. 34; the sister engine, No. 35, had been withdrawn a few years before. They are illustrated on page 113 of the February, 1926, RAILWAY MAGAZINE; they were built by Neilson & Co. in 1873. It is to be hoped that the Great Southern Railways will not break up old No. 1 of the W. & T. Railway, as it is a fine example of the fine service and good workmanship of the old locomotive builders.

"It is of interest to note that the 0-4-2 tender type is now extinct in Ireland, as the last of that numerous race, No. 26, of the Northern Counties line, was scrapped in 1925. Of course it must be remembered that the 0-4-2 passenger or mixed-traffic engine never made its appearance in Ireland, all of the type being goods engines, though not entirely confined to such service. The D. & S.E. Railway had seven of the class at the amalgamation, 1925, all of which were immediately withdrawn."

Messrs. R. A. Jackson and C. J. Coghlan write correcting Mr. Casserley more or less on the same lines.

**Filming a Railway Scene.**

MR. V. WINCHESTER writes: "While waiting at Hitchin on December 7, some interest was being shown in the filming of the L. & N.E. 'Pacific' No. 2546, *Donovan*, by British Instructional Films, Limited, of Welwyn. The scene, which I heard was for a film called 'The Celestial City' (that was what I understood it to be), was that in which the villain for some reason or other had, as far as I could gather, to climb over the engine while she was running at over 60 m.p.h. For this purpose a siding on the West (down) side of Hitchin station had been hired, and at the most convenient place for the filming the rails had been well greased for some considerable distance. While I was there I saw the engine get up speed of over 60 m.p.h., but as, in addition to the rail-greasing, she had her tender brakes on, she went forward at about 2 m.p.h. I shuddered to think what would have happened had the driver misjudged the distance to the end of the greased patch, as on one occasion he pulled up suddenly from his 'hogging' with about a yard of 'grease' in front of him. The rest of the film was being made at Welwyn, where accommodation could be found for the train. Unfortunately, none could be found for the locomotive, so its part had to be done elsewhere, or rather at Hitchin, and so it came to my knowledge."

**The Latimer Road and Acton Railway.**

MR. R. D. JAMES writes as follows:—

"About 1882 the above scheme was in progress. Later on, girders for a bridge were thrown across the N. & S.W. Junction (N. London) Railway, near Friars Place, Acton. Those remained until the war period, when they were removed for other usage, leaving only the derelict supports. Later still, the Metropolitan Railway sought powers to make a line from Latimer Road to Acton to connect with the new Central London (G.W.) Extension to Ealing then projected. Now, the arterial 'Western Avenue,' starting from Wood Lane, pursues a course to North Acton just about covering the track of the abandoned railway. This is rather a strange instance of a road scheme surviving two defunct rail schemes. Probably, had this railway ever been made, it would have given the Metropolitan an outlet to western suburbs now served by the Wycombe line of the G.W.R."

**Dublin Suburban Traffic.**

A GREYSTONES reader sends the following notes in regard to the suburban route between that place and Dublin:—

"This station is 17 miles from Harcourt Street terminus, and there are eight intermediate stations. The local trains (those which stop here, and then return) are booked for the most part to call at every station, and do the trip in 45 minutes. The express trains, stopping at Bray on the down run, take 42 minutes. On the up journey the fast trains stop at Bray and Ranelagh, and are allowed 45 minutes. There used to be a 9.48 a.m. which reached Harcourt Street at 10.35 a.m., two minutes more than the slow train. There was also a 1.9 a.m. which got into Harcourt Street at 1.48 p.m., 39 minutes, but this has been discontinued. On a recent occasion, however, I travelled up by the 12.20 p.m. express. It left Greystones at 12.32 p.m.,

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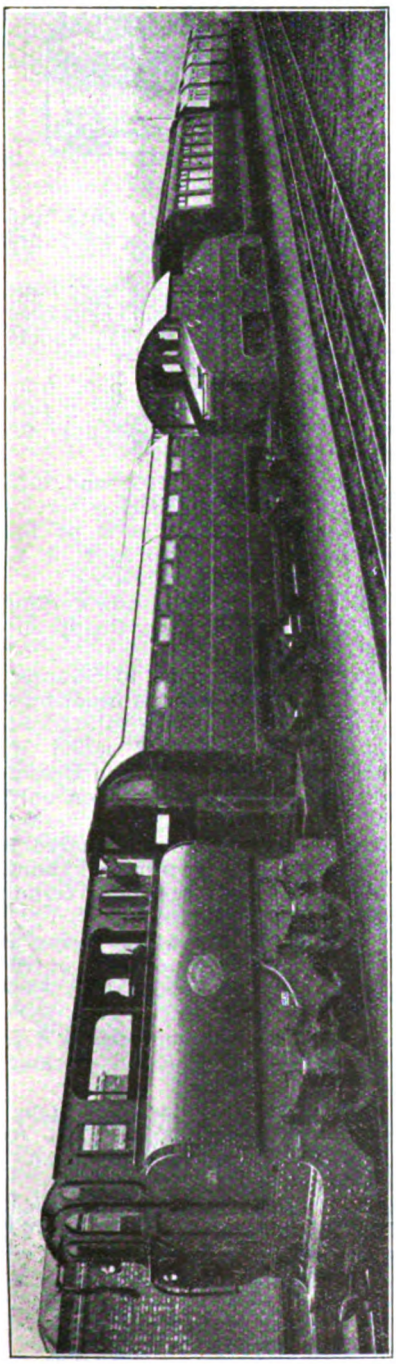
and reached Harcourt Street at 1.8 p.m., three minutes late.

"Turning to the Westland Row line (19 miles from here), there are 14 intermediate stations. Up trains do not usually stop between Dunlaoghaire and Westland Row. The down Limited Mail leaves at 6.35 a.m., stops at Dunlaoghaire and Bray, and reaches here at 7.20 a.m. The local trains, the 9.45 p.m. for example, arrives here at 10.31 p.m., according to the time-table. Others are booked to consume a couple of minutes longer. On the up journey the business train leaves at 8.46 a.m., stops four times, and gets into Westland Row at 9.28 a.m. The 9.10 a.m., stopping everywhere to Dunlaoghaire (six stops), arrives at 9.54 a.m. The up Limited Mail, stopping only at Bray and Dunlaoghaire, leaves at 6.50 p.m., and reaches Westland Row at 7.38 p.m."



**"UNDERGROUND" EXHIBITION OF TUBE RAILWAY LOCOMOTIVES AND ROLLING-STOCK.**
This included original type locomotive and car, City & South London Railway, Central London Railway electric locomotive, and examples of modern "Tube" rolling-stock.

**Progress in "Tube" Car Design.**

THE London public has long regarded its familiar "tube" railways as the last word in modern construction and up-to-date equipment, and it is interesting, when opportunity offers, to look back and trace the rapid evolution of the present-day comfortable, well-lighted "tube" rolling-stock from the early cars placed in service on the City and South London Railway at its opening in 1890. Such an opportunity was afforded in December at South Kensington station, when the London Underground Companies staged an exhibition of rolling-stock illustrating the progress made in design during the past 38 years. At one end of the train stood a City and South London electric locomotive built in 1900, 10 years after the line was first opened. It weighs about 14 tons, and is equipped with two 75-H.P. D.C. motors, the armatures of which are built direct on the axles. The main air reservoirs on the engine, supplying power for operating the Westinghouse brake, were replenished as required from stationary plant at the terminal stations. Adjoining this early locomotive was one of the original cars used on the same railway. It weighs approximately 7 tons, and seated 32 passengers. Owing to the absence of scenery on the original line, it was not considered necessary to provide more than a narrow window just under the roof on either side, while the upholstery was carried up to this on each side. The wide contrast between the interior appointments of the car and the modern examples of steel car construction exhibited with their ample windows, air-operated doors and wide doorways, and bright, clean interiors, was no less striking than the enormous advance illustrated by the modern electrical equipment, with its safety devices, automatic acceleration, and loud speaker and transmitter communication between driver and guard.

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## L.M.S.R.

New 4-4-0's Nos. 578–9, 590–1–5–7 are in service on the G. & S.W. section. New 0-6-0 dock shunting engine No. 11274 is working in Glasgow. Steam rail car No. 10608 (L. & Y. No. 11) has been working the Moffat branch, having been used earlier between Girvan and Ayr *via* Maidens. Nos. 10010–1–3 (M. & C. Nos. 4, 2 and 16) have been scrapped.—[J. F. McEwan.]

M.R. 0-4-4T No. 1253 is working between Edinburgh and Barnton, coupled between two L.N.W. composite auto-car sets. One of the new L.M.S. 0-6-0 dock shunting tanks, No. 11272, is at Dalry Road, apparently for working in Leith Docks.—[" Cardean."]

Old DX 0-6-0 No. 8060 has been on passenger shunting at Manchester, London Road. Reboilered " Claughtons " Nos. 5906 *Ralph Brocklebank*, 5910 *J. A. Bright*, 5970 *Patience*, and 5986, 5993 and 5953 have been working Irish Mail expresses from Holyhead, the engines usually working through to Euston and back next day.—[R. S. McNaught.]

Seven London Electric Railway coaches, on the way to London for delivery from the makers, were noted at Bedford on an L.M.S. goods train. Special coupling wagons were necessarily used at each end to allow for the different buffer heights.—[" Cranmere."]

The name *Croxteth* is now carried by " Claughton " No. 5971. [Presumably old 2-4-0 No. 7936 which previously had that name has been withdrawn.—Ed., *R.M.*]—[J. G. Forsyth.]

Caprotti valve gear fitted " Claughton " No. 5927 *Sir Francis Dent* has been working with the indicator shelter for test purposes. Compound 4-4-0's Nos. 1054-5 have double-armed regulators as on " Royal Scot " engines.—[" Camden."]

Nos. 6115 and 6137, *Scots Guardsman* and *Vesta*, have been working with dynamometer car and specially loaded trains on " The Royal Scot " express.—[W. R. Coleby.]

Reboilered " Claughtons " at Longsight (16) include Nos. 5957, 5962, 6013 and 6017. Several L.N.W. 4-4-0's and 4-6-0's are now at Stoke.—[" Moonstone."]

Two mistakes occurred in February issue notes. The name *Talisman* should have been *Talavera*, and No. 1453 (0-4-4T) should have been 1423.—[R. H. Dane.]

Train due St. Pancras 5.5 p.m. from Bradford was recently drawn by 2-4-0's Nos. 230 (red) and 235 (black).—[J. W. Middleton.]

0-6-4T's Nos. 2007, 2008, 2022 and 2023 are the only ones left on suburban service from Manchester (Central), most of the other turns being now worked by L. & Y. 2-4-2T's Nos. 10900–5.—[R. Dyson.]

2-6-4T and 4-6-4T engines are now working between Manchester (London Road) and Buxton.—[G. Beckett.]

2-6-4T No. 2320 has gone to Swansea. 0-6-0T No. 16558, with express headlamps, worked an express from Stoke to Stafford. The " Claughton " No. 6012 noted by K. R. Vasey on " Royal Scot " on December 27 was working a relief portion only. " Jumbos " still act as pilots on various trains, and there is nothing remarkable about their appearance on principal trains, though frequently they run over certain stages only.—[C. R. Prescott.]

Mr. R. S. McNaught mentions seeing at Manchester stations three engines of the same name—at London Road, L.M.S. 4-6-0 (" Experiment " class) and L.N.E. 4-9-0 (G.C. class), and at Exchange the G.W.R. of the same name—*City of Chester*—working, moreover, from Chester.

L.M.S. 0-6-0's Nos. 4531–2 worked through from Tottenham to Reading, G.W.R., for a Tottenham *v.* Reading football match.—[R. E. Daniells.]

New 2-6-4T's Nos. 2325–6 are now being placed in service. Johnson 4-2-2 No. 673 and Kirtley 0-6-0 (built 1856) have been repainted at Derby for preservation. Information is desired as to outside cylinder 0-4-0ST No. 11200. Deeley 4-4-0's Nos. 806–8–9 (" 990 " class) have been scrapped.—[H. N. James.]



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New 2-6-0 mixed traffic engines Nos. 13101, 13102 and 13106, following a return visit to the works for painting, have now been despatched from Crewe for service on the Northern Division. The remainder of the batch are expected to follow immediately. These engines conform, in all respects, to the preceding series, Nos. 13000–13099. 4-6-0 four-cylinder "Claughton" class engine No. 5908 *Alfred Fletcher* (old No. 1327), which was fitted with Caprotti valve gear in 1926, is now running rebuilt with large boiler, similar to those of the same type which were converted last year. The 10 engines thus altered are all stationed at Longsight. Of the corresponding engines which retain the Walschaert's motion, Nos. 5906, 5910, 5953, 5970, 5986 and 5993 are stationed at Holyhead, and Nos. 5972, 5999, 6004 and 6017 are at Camden. A series of tests with engines of both series is at present being carried out between Crewe and Euston. No. 11271, the second of a series of new-type 0-6-0 dock tank engines, recently constructed at Derby, is now being tested at Birkenhead. With the naming of certain of the "Royal Scot" type engines after early historic locomotives, it became apparent that, sooner or later, those L. and N.W. engines which bore similar names would either be renamed or have their names taken off altogether. A start in that direction has now been made, the name plates *Lady of the Lake* having been removed from "Experiment" class 4-6-0 No. 5468. Originally, there were 15 such engines, but of these five have since been scrapped, viz., 2-4-0 Nos. 5035 *Hector*, 5036 *Novelty*, and 5057 *Courier*; 4-4-0 No. 5190 *Ajax*; and 4-6-0 No. 5492 *Sanspareil*. The remainder, all of which will now probably lose their nameplates, are 4-4-0 Nos. 5116 *Goliath*, 5312 *Velocipede*, 5397 *Planet*, and 5398 *Meteor*; 4-6-0 Nos. 5658 *Atlas*, 5669 *Vulcan*, 5672 *Condor*, and 5682 *Samson*; and 0-6-0T No. 7334 *Liverpool*. The following additional 2-4-0 "Jumbos" have recently been taken out of traffic :—Nos. 5022 *Abercrombie*, 5030 *Madge*, 5078 *Fairbairn*, and 5085 *Hero*.—[G. WILLIAMS.]

## L.N.E.R.

Tram engines Nos. 7131–6 are at Wisbech. Nos. 7131 and 7133 were noted in steam, these being ordinarily sufficient since passenger traffic was discontinued on January 1, 1928. Information is desired as to other tram engines, and where used.—[W. GOODYER.]

New 4-6-0's Nos. 2806 *Audley End* and 2802 *Walsingham* (stationed in Manchester), have worked between Manchester and Ipswich on the Continental Boat Express. C.L.C. 45-min. expresses between Manchester and Liverpool now stop at Farnworth without additional time. 0-6-0 No. 6078 was built in 1904–5, and was classed "9J" in the G.C. list.—[R. DYSON.]

The down "Flying Scotsman" is sometimes double-headed from Berwick to Edinburgh, presumably for operating convenience. 0-6-2T No. 2687 is working on the N.B. section.—[C. M. FURST.]

New 0-6-2T's Nos. 2628–9 and a considerable number of the "J39" new standard 0-6-0 tender engines of the "2700" series are at Stratford. "Raven" 4-6-2 No. 2402 *City of York* worked the up "Flying Scotsman" on January 7, coming on at York. On January 5, "Pacific" No. 2547 *Doncaster* was working the North express, due King's Cross at 4.30 p.m., which loaded to 18 corridors, or nearly 600 tons train weight. A steam-pipe joint blew out north of Hitchin, and as the pressure was seriously diminishing, a special stop was made at Hitchin. Within the commendably short time of 4 min. an "Atlantic" was attached in front, and the two engines together made a very creditable run on to King's Cross, passing Wood Green at 75 m.p.h. The three "Pacifics" in the northern area, which have been fitted with 220-lb. pressure boilers, viz., Nos. 2573, 2578 and 2580, retain 20-in. diam. cylinders. A new long and heavy "Pacific" turn for Grantham engines every week-day is as follows :—3.3. a.m. Grantham to London; 7.15 a.m. King's Cross to Doncaster; 10.35 a.m. Doncaster to York; 12.21 p.m. York to Peterborough. Light or milk vans, Peterborough to Grantham. Total, 435 miles. Two sets of men.—[R. A. H. W.]

Gorton-built 0-6-2T's of the "2630" series are now going to the G.E. section. The latest 4-6-2 is No. 2749 *Flamingo*.—["ST. GATIEN."]

"Sentinel-Cammell" rail car No. 51908 *Expedition* is at Norwich. 2-6-0 No. 4655 is now at Norwich.—[R. W. FITZJOHN.]

Outside-crank 0-6-0's Nos. 5495, 6425, 6445 and 6434 have been scrapped. Ex-L.D.E.C.R. 0-4-4T No. 6406 recently visited Manchester.—[W. R. LAWRENCE.]

G.E. "J68" 0-6-0T's Nos. 7033 and 7036 are now stationed at Ardsley. London-Leeds expresses are now often handled between Doncaster and Leeds by G.C. "Director" 4-4-0's, Nos. 5507 and 5510, both painted black, having been noted on such trains. New "N2" 0-6-2T's ex-Hawthorn, Leslie and Co. Ltd. have been "run in" from Ardsley sheds.—["CLAUD 8810."]

N.B. 0-6-0's Nos. 10188 and 10206 have been scrapped. 0-6-2T's Nos. 2685–6 are working in the Edinburgh district.—[J. D. BLAIR.]

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4-6-2 No. 4476 *Royal Lancer* recently worked the "Queen of Scots" Pullman express between Edinburgh and Glasgow.—["VICH IAN VOHR."]

G.N. 4-4-2's Nos. 3276 and 3295 recently worked from Sheffield to Reading on football specials.—[R. E. DANIELLS.]

Sentinel-Cammell cars *Royal Eagle* and *Fair Maid* are working in the Edinburgh district.—[I. N. TURNER.]

### S.R.

Rebuilt 0-6-2T's Nos. B94, 95, 96, 108, 135 and 695 are now working in North Devon.—[A. HALLS.]

"King Arthur" 4-6-0's now occasionally visit Reading.—[D. E. WARD and R. E. DANIELLS.]

New 0-8-0T No. A950 is now in service. "Lord Nelson" class 4-6-0 No. E858 *Lord Duncan* is now at work.—["745 TINTAGEL."]

### Somerset & Dorset Joint Railway.

Old 0-6-0's Nos. 19 to 24 are to be scrapped. These engines were built in 1874 by J. Fowler & Co., of Leeds, to G.N.R. designs, and had domeless boilers and Stirling cabs. They were afterwards fitted with Johnson boilers, while at a later date Deeley boilers were supplied, and the cabs provided with extended roofs. They were always known as the "Fowlers." The new 0-6-0T's are Nos. 19 to 25, and several are stationed at Templecombe.—["CONSOLIDATION."]

### Mersey Railway.

The only steam locomotive owned by this line is not one of the original Mersey engines, as suggested in a note in the January RAILWAY MAGAZINE. It was purchased as recently as 1925 from the Metropolitan Railway, on whose books it was classified "A" and numbered 7. On the Mersey Railway it is No. 2, having replaced an earlier engine No. 1 in 1925. Of the well-known Beyer, Peacock 4-4-0 type, with side and rear tanks, No. 2 has had its footplate covered in and it was fitted with a new boiler in 1919. Leading dimensions are: Cylinders, 17 in. × 24 in.; coupled wheels, 5 ft. 10 in.; and bogie wheels, 3 ft. diam. Wheelbase, bogie, 4 ft.; rigid, 8 ft. 10 in.; total, 20 ft. 9 in. Working pressure, 160 lb. per sq. in. Weight in working order, 45 tons. The engine is painted Indian red, with lining on side tanks and bunker to form panelling, the lining consisting of broad gold lines with black edging. The number and the incription "Mersey Railway" is in gold leaf on the side tanks. No. 2 is used by the engineering department in non-traffic hours, and is kept on a covered siding near Birkenhead Central station.—[R. S. MCNAUGHT.]

### Great Southern Railways (Ireland).

4-4-0 No. 452 formerly worked from Wexford shed on main-line trains, but recently was transferred to Bray, working principally on the Harcourt Street line. It has been recently sent back to Wexford. 4-4-0 No. 453 works the mail trains principally, with No. 334. 2-4-0 No. 425 and Nos. 431–2 (2-4-2T), recently transferred from Bray to Grand Canal Street, still work from that shed. 0-4-4T No. 80 is again attached to Grand Canal Street shed, together with 4-4-2T's Nos. 270, 274 and 0-4-4T No. 279.—[G. COGHLAN.]

M.G.W. 0-6-0's Nos. 74 *Luna*, 67 *Dublin*, and 49 *Marquis* and 0-6-0ST No. 116 have not yet been renumbered. The latest engines from Inchicore works are 2-6-0's Nos. 387, 388 and 389. No. 389 has been fitted experimentally with a "Dabeg" feed-water heater. The type used on 4-6-0 No. 500 is a "Bredin-Burrell." New 2-6-2T No. 850 is working between Amiens Street and Bray on the principal fast trains with great success.—[K. DAVISON and R. A. JACKSON.]

Information which duplicates that used above, or which is met by material appearing on other pages of the present issue (or published last month in the case of letters received after closing for press and prior to actual publication of that issue) is not included, while there is necessarily much other information in letters received beyond that given. Acknowledgment may also be made of letters from "Framlingham," E. Little, "Go Without Risk," S. P. W. Corbett, T. H. Donohue, J. C. Jones and J. H. P. Capell, D. H. Miles, G. Beckett, R. H. Dane, "Moonstone," R. F. Kemball, "Peel," D. Magee, T. E. (Warrington), C. S. Hopewell, "King Edward VII," F. W. Johnson, C. Macdonald, E. H. B. Brown, Edwin Bury, R. E. Daniells. F. Lemmon, G. F. Raynor, "St. Gatien," and others.

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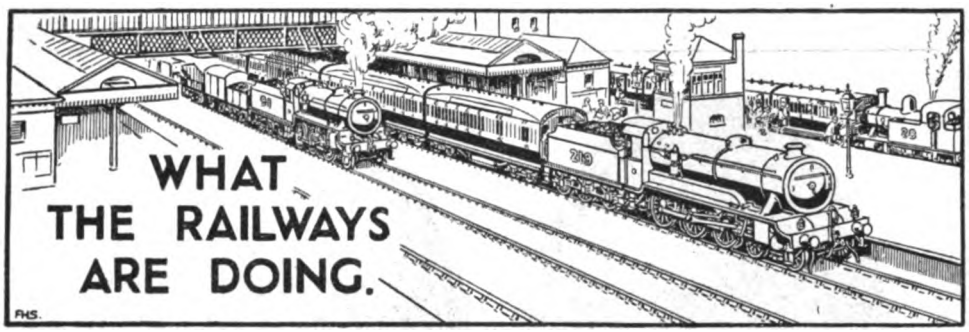


### G.W.R. Civil Engineering Department Appointments.

We are officially advised of the following appointments, which are effective forthwith :—

Mr. R. Carpmael, Assistant Engineer, to be Chief Engineer.

Mr. E. G. Matheson, Assistant Engineer, to be Assistant Chief Engineer (Works and Structures).

Mr. A. S. Quartermaine, Divisional Engineer, Bristol, to be Assistant Chief Engineer (Permanent Way and Docks), Paddington.

Mr. S. W. Moore, Divisional Engineer, Neath, to be Divisional Engineer, Bristol.

Mr. J. E. S. Griffith, Permanent Way Assistant, Reading, to be Divisional Engineer, Neath.

Mr. W. Cleaver, Resident Docks Engineer, Newport, Barry and Penarth Docks, to be Divisional Docks Engineer, Newport, Cardiff, Barry and Penarth Docks.

**MR. R. J. M. INGLIS,**
Appointed Assistant Engineer (Permanent Way), Southern Area, L.N.E.R., as from January 31.

* * *

### L.M.S.R. Appointments.

The following appointments have been authorised :—

*Chief Marine Superintendent's Department.*

Mr. A. T. Cotton (of Heysham) to be Superintendent Marine Engineer, Euston.

Mr. J. Gibson (of Goole) to be Marine Engineer, Heysham.

Mr. T. W. M. Beasley to be Marine Engineer, Goole.

*Chief General Superintendent's Department.*

Mr. A. J. Perryman to be Chief Controller, Manchester.

*Road Motor Engineer's Department.*

Mr. W. E. Yates to be Assistant Road Motor Engineer, Euston.

Mr. V. R. B. Cooke to be Indoor Assistant, Euston.

Mr. E. W. D. Webster to be District Road Motor Engineer, Birmingham.

Mr. D. W. Ostle to be District Road Motor Engineer, Manchester.

Mr. A. Brentall to be District Road Motor Engineer, Watford.

* * *

Mr. R. J. M. Inglis, who has been appointed Assistant Engineer (Permanent Way), Southern Area, L.N.E.R., was educated privately at Bonnington Park School, Edinburgh University, and Heriot Watt College. He joined the North British Railway Engineer's Department as a pupil in 1898, being taken on the staff in 1900. In 1902 he was appointed Assistant Resident Engineer, and in 1903, Resident Engineer on the construction of the High Street Goods Warehouse, Glasgow, and yards and widenings in connection therewith. In 1905 he returned to the Head Office in Edinburgh, and was in charge of various large contracts. In 1910, when Mr. C. J. Brown became Engineer-in-Chief, he was appointed Chief Assistant in the New Works Department, and had the supervision of many contracts. In 1911 he was appointed District Engineer



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**MR. E. G. MATHESON,**
Appointed Assistant Chief Engineer (Works and Structures), Great Western Railway.

**MR. A. S. QUARTERMAINE,**
Appointed Assistant Chief Engineer (Permanent Way and Docks), Great Western Railway.

**MR S. W. MOORE,**
Appointed Divisional Engineer, Bristol, Great Western Railway.

**MR. W. CLEAVER,**
Appointed Divisional Docks Engineer, Newport, Cardiff, Barry and Penarth Docks, Great Western Railway.

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Northern Division, and in 1916 was transferred to the Western Division, with headquarters in Glasgow. In 1919 he was appointed Deputy Chief Engineer, Railways, at the Ministry of Transport, and in 1921, Acting Chief Engineer. In 1921 he returned to his old Division in Glasgow. In 1910 he took command of the R.E. Unit of the O.T.C. at Edinburgh University, which had just been formed by Prof. Sir T. Hudson Beare, and at the outbreak of war, in 1914, Mr. Inglis, holding the rank of Captain in the Royal Engineers, T.F., immediately volunteered for service. He was appointed Adjutant to the first Training Camp for officers at Barry under Lord Kitchener's Scheme. In October, 1914, he applied for service abroad, but was recalled to the railway service, owing to his position as District Engineer on the railway along the East Coast, embracing the Rosyth Naval Base and the Docks at Methil and Burntisland. Mr. Inglis is a member of the Institution of Civil Engineers, and a Fellow of the Royal Society (Edinburgh).

* * *

MR. E. G. MATHESON, A.M.Inst.C.E., who has been appointed Assistant Chief Engineer (Works and Structures), Great Western Railway, has held the position of Assistant Engineer as from January 1, 1926. He joined the New Works staff of the Great Western Railway in 1905, under Mr. W. Y. Armstrong, and for a time was employed at the head office in the preparation of plans and estimates for projected lines in South Wales, and afterwards assisted the Resident Engineer in the construction of the Ashendon & Aynho Railway, and the reconstruction of Snow Hill station, Birmingham. Mr. Matheson volunteered for service in 1915, commanding a Railway Instruction Company in France, held the rank of Major, was twice mentioned in despatches, and awarded the O.B.E. (Military). After demobilisation in 1919 he was Resident Engineer on the construction of the St. Denis Branch Deviation, the Kingswear Branch Deviation, and the enlargement of Parson Tunnel, Dawlish, and then for two years Assistant Divisional Engineer, Bristol. In October, 1924, he was appointed Divisional Engineer, Bristol. Mr. Matheson is a brother of Mr. D. A. Matheson, late Deputy General Manager for Scotland, L.M.S.R.

* * *

MR. ALLAN S. QUARTERMAINE, M.C., B.Sc. (Eng.), M.Inst.C.E., Divisional Engineer, Bristol, who has been appointed Assistant Chief Engineer (Permanent Way and Docks), G.W.R., graduated in engineering science at London University with first-class honours, won the Chadwick Scholarship and Gold Medal for municipal engineering and the Head Memorial medal for civil and mechanical engineering, also the University College diploma for civil engineering (with distinction) and for mechanical engineering. After a period of practical training under the Hertfordshire County Surveyor and with the Tees-side Bridge & Engineering Company, Mr. Quartermaine joined the service of the Great Western Railway in 1910 and was attached to the Divisional Engineer's Office at Wolverhampton. He resigned in 1911, but in 1912 he re-entered the service in the Wolverhampton Office, and in 1913 was transferred to the Chief Office at Paddington as an Assistant. In 1920 he was appointed Chief Assistant to the Divisional Engineer at Gloucester, and in 1924 returned to Paddington as Assistant to the Joint Chief Engineers, leaving there in January, 1926, to take up the position of Divisional Engineer at Bristol. Mr. Quartermaine went to Egypt in 1915 as a second lieutenant in the 116th Company, R.E. Subsequently he was detached from this unit and engaged on railway location work across the Sinai Desert and afterwards as officer-in-charge, Military Railway Works, Kantara. In February, 1917, he was appointed New Works Engineer for the Palestine Military Railways and occupied that post until his return to England in 1919. Mr. Quartermaine was promoted to the rank of Major, mentioned in despatches and awarded the Military Cross. In 1924 he raised and commanded the Railway Bridging Company of the Royal Engineers (Supplementary Reserve) which was enrolled from the four railway groups. He handed over the command on his transfer to Bristol and was placed upon the Regular Army Reserve of Officers with the rank of Major.

* * *

MR. S. W. MOORE, who has been appointed Divisional Engineer, Bristol, G.W.R., has held the position of Divisional Engineer, Neath, since early in 1924. He spent three years as a pupil under the late Mr. Kenneth Bayly, Chief Engineer of the Great Southern & Western Railway of Ireland, and was appointed Resident Engineer for a few years on coast defence works then being carried out by the Antrim County Council. Following the completion of this work, Mr. Moore was connected for short periods with railway schemes in Donegal. In 1898 he joined the New Works Department of the Great Western Railway at Paddington, where he remained until 1916,

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when he was transferred to the staff of the London Divisional Engineer. In 1917 he was appointed Chief Assistant to the Divisional Engineer at Taunton.

* * *

MR. W. CLEAVER, M.Inst.C.E., who has been appointed Divisional Docks Engineer, Newport, Cardiff, Barry and Penarth Docks, G.W.R., has held the position of Resident Docks Engineer at Newport, Barry and Penarth, since August, 1925. He was formerly Chief Engineer to the Port Talbot Railway & Docks Company and, on the absorption by the Great Western Railway of that company, was appointed Resident Docks Engineer at Newport. Mr. Cleaver was born in 1873 at Oullwyn, Glamorganshire, and received his education at Neath. He served a pupilage from 1888 to 1891 in the fitting and erecting shops of Taylor & Sons Ltd., Briton Ferry, and was appointed Junior Draughtsman in 1892, being subsequently promoted to the position of Chief Draughtsman and Works Assistant. In June, 1898, he joined the Port Talbot Railway & Docks Company as Chief Assistant to the then Resident Engineer on the construction and maintenance of the new docks and railways. He was appointed Chief Engineer to the Port Talbot Railway & Docks Company in May, 1905, and held that position until the absorption.

* * *

MR. W. C. GOODCHILD, who has been appointed Chief Outdoor Assistant, Derby, Chief Mechanical Engineer's Department, L.M.S.R., has been for a number of years on the staff of Sir Henry Fowler, Chief Mechanical Engineer. After four years' technical training in London and Taunton, Mr. Goodchild was for a year engaged in Ireland before joining the service of the Midland Railway at Leicester in 1893 as Resident Engineer in charge of the gas-power electric generating station, then being erected. In 1898 he was transferred to Derby to act as an Assistant to Mr. J. Sayers (now Telegraph Superintendent, L.M.S.R.) in the supervision of the company's generating stations. From January 1, 1903, on the retirement of the late Mr. W. Langdon, Telegraph Superintendent, the electric lighting and power work was transferred to the Locomotive Superintendent (then the late Mr. S. W. Johnson), and Mr. Goodchild was placed in charge of mechanical and electrical maintenance of the power stations until 1913. In 1906 and subsequent years the maintenance of the hydraulic power plants and machinery, locomotive water supply, gas works and gas lighting, weighing machines and manual cranes were successively added to his duties as Outdoor Assistant to the Chief Mechanical Engineer (Sir Henry Fowler, K.B.E.). Mr. Goodchild has specialised in power station operation, oil gas manufacture, combustion and fuel economy, and the effect of the quality of waters in locomotive boilers. He has also given attention to illumination problems, especially those connected with gas lighting, and was a railway companies' representative before the Fuel Research Board in connection with the Gas Regulation Act (1920). He is now a railway companies' representative on the National Illumination Committee; and is a Member of the Institution of Electrical Engineers and of the Institution of Mechanical Engineers.

* * *

MR. E. H. D'E. DARBY, who has been appointed Divisional Engineer, Derby, L.M.S.R., was educated at Cheltenham College and Clare College, Cambridge University, taking the B.A. degree (Mathematical Tripos) in 1902. In October of that year he commenced a term of pupilage under the late Mr. E. B. Thornhill, then Chief Engineer of the London and North Western Railway. Part of this period was spent in the drawing office at Euston and assisting on the construction of Garston New Dock, where he became Assistant to Mr. W. E. Thornhill in 1905. remaining on this work until its completion in 1910. He was then appointed Assistant to the District Engineer at Walsall, where he remained till 1917, except for a short period on railway work in France. From January, 1918, he acted as District Engineer at Crewe, which appointment was confirmed in 1919. In September, 1920, he was appointed District Engineer, Manchester, which position he held until being appointed Divisional Engineer (Eastern Division), Derby, in January of this year.

* * *

AT a meeting of the Irish Railway Clearing House Committee, held at 5, Kildare Street, Dublin, on January 30, Sir Walter R. Nugent, Bart., was unanimously re-elected Chairman of the Committee for the year 1929.

* * *

WE are officially informed that the L.N.E.R. has appointed Mr. T. F. Day, Chief Goods Canvasser, Southern Area, to be District Goods Manager, Sheffield, in succession to the late Mr. J. W. Simpson.

* * *

THE Board of the Metropolitan-Cammell Carriage, Wagon & Finance Co. Ltd. has been formed as follows:—Mr. T. L. Taylor

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(Chairman), Mr. W. L. Hichens, Mr. G. G. Sim, Mr. R. C. Irwin, Mr. W. Howard-Williams, Sir Alexander Gracie, Mr. R. Whitehead, Mr. A. J. Boyd, Mr. Alex. Spencer, Mr. P. Wheeler, Mr. J. P. Crouch (Commercial Director), and Mr. A. S. Bailey, M.Inst.C.E. (Managing Director). Mr. D. M. Moffat, C.A., is appointed Secretary.

* * *

THE opening on February 1 of a new £109,000 branch line connecting the L.M.S.R. with the Bolsover Colliery Company's Clipstone colliery marks a further stage in the transport speed-up scheme the L.M.S.R. Company has in hand for developing the Nottinghamshire coalfields. The branch, which is just over 3 miles long, connects the colliery with the Rufford branch line near Mansfield and will open up a new avenue of transport, both to the north and south of England.

* * *

A LECTURE on lubrication and lubricators was given by Mr. Andrew Bissett, Scottish representative of C. C. Wakefield & Co., London, in the Royal Technical College, Glasgow, on a recent Sunday. The meeting was held under the auspices of the Parkhead (L.N.E.R.) Locomotive Instruction Class and was organised by Mr. A. E. MacAusland, Hon. Secretary, as one of a series of bi-monthly open lectures. The lecture was well attended by running and other staffs of both the L.N.E.R. and L.M.S. Railways. Mr. S. Groom, Locomotive Running Superintendent (Scotland), L.N.E.R., presided, and was supported by Mr. John Barr, Locomotive Running Superintendent, L.M.S.R. and Mr. G. W. Phillips, Chief Assistant to the Locomotive Running Superintendent L.N.E.R. Glasgow.

* * *

MR. PAUL GIBB, Goods Manager, North Eastern Area, L.N.E.R., lectured recently at the York Railway Institute to a joint meeting of the York Railway Lecture and Debating Society and the Yorkshire branch of the Institute of transport, on "Coal Shipping Methods on the North-East Coast." In the absence of Sir John Eaglesome, Leeds, President of the Yorkshire branch of the Institute of Transport, the chair was taken by Mr. A. Brown, District Goods Manager, Leeds, L.N.E.R.

[*Keystone*.

**NEW PLATFORM OVER THE RIVER IRWELL, LINKING VICTORIA AND EXCHANGE STATIONS, MANCHESTER, L.M.S.R.**

* * *

THE L.N.E.R. has inaugurated a new system of period excursions on Sundays. Bookings are given in connection with Sunday half-day excursions, not only for the half-day, but for 5, 7 and 14 days, thus enabling passengers to travel outward on Sunday and return the following Thursday, Saturday, or Saturday week.

* * *

THE L.N.E.R. announces a daily sleeping-car service to Fort William, leaving King's Cross at 7.30 p.m.

* * *

THE Minister of Transport has recently made the undermentioned Order: The Jarrow East End Light Railway Order, 1929, authorising the construction of a light railway in the Borough of Jarrow in the County of Durham.

* * *

THE L.N.E.R. announces that by the introduction of new steam rail coaches, 38 additional passenger services now operate in the Middlesbrough and Sunderland districts. The new coaches are of a similar type to those which have been introduced in many districts of the L.N.E.R. during the last 12 months.

* * *

THE L.N.E.R. has acquired, in Manchester, the premises known as the Ashburys Carriage and Wagon Works. The property, comprising an area of 20 acres, is in a key position

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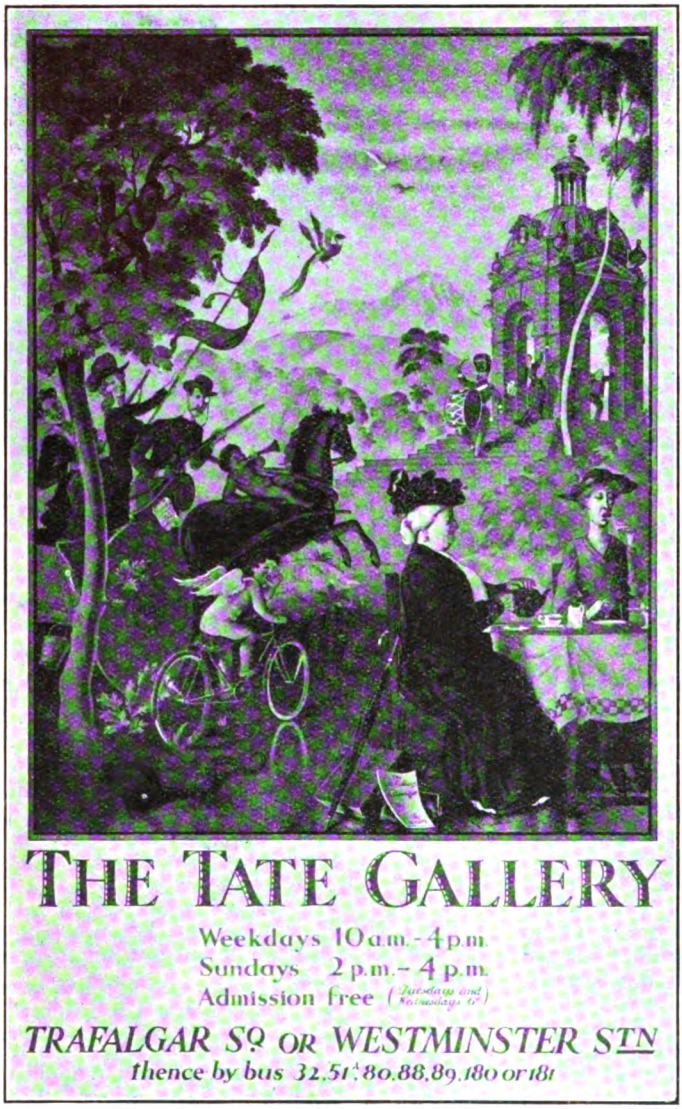
THE TATE GALLERY
Weekdays 10 a.m.-4 p.m.
Sundays 2 p.m.-4 p.m.
Admission free (Tuesdays and Wednesdays 6d.)
TRAFALGAR SQ OR WESTMINSTER STN
thence by bus 32,51,80,88,89,180 or 181

A NOTABLE "UNDERGROUND" POSTER.

being adjacent to the main line of the L.N.E.R., and has direct road facilities to all parts of the city and the surrounding district. This valuable reserve is intended for commercial development, according to the expansion of the company's business beyond the capacity of their present large goods depot in Manchester, *i.e.*, Deansgate, Ducie Street, and Ardwick.

* * *

THE L.N.E.R. announces that fast express freight train services have been inaugurated between Liverpool (Huskisson) and Brunswick stations and Sheffield, Nottingham, Leicester and London. This service has been arranged primarily to give "after business hours" departure from Liverpool to ensure "first thing" delivery in the morning following despatch.

* * *

EVER on the *qui vive* for something specially attractive in connection with their publicity campaign, the "Underground" companies are just now exhibiting a poster that is bound to attract considerable attention and evoke much comment—the very essence, of course, of successful advertising. The picture in question, of which a reproduction is given herewith, is one of the "Underground's" London attractions series, and relates to the Tate Gallery at Millbank. It represents part of Mr. Rex Whistler's wonderful mural embellishment of the spacious apartment there known as the tea-room. Quite obviously, Mr. Whistler is an artist gifted with a remarkably fertile imagination, and his allegories are naturally capable of all sorts of curious "readings." Exactly what the present picture poster means we make no pretence of knowing. But since Dan Cupid is very much to the fore therein we suspect the "story" to be merely one of "Love at First Sight"—the dashing young Nimrod with the gun and the monocle instantly succumbing to the charms of the dainty damosel on the extreme right of the picture!

* * *

ON January 6 a system of issuing tickets by travelling ticket collectors on the Sunday suburban trains running between Dyce and Culter (13½ miles) in the Aberdeen suburban district was introduced. The trains, two in number, make nine journeys in each direction between Aberdeen and Culter and Aberdeen and Dyce, commencing at 1.30 p.m. and every hour afterwards until 9.30 p.m.,

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and were first introduced on Sunday, June 3, 1928, to counteract road service opposition. Formerly the trains consisted of six-wheeled non-corridor stock, but vestibuled bogie carriages are now used. One train consists of brake third and composite (11 third and 2½ first-class compartments), and the other train of two saloons (seating 48 passengers each) and brake composite (three third and two first-class compartments). Each train is manned by a guard and a travelling ticket collector, and the innovation proved very popular with the public. The ticket collector is supplied with sets of tickets at the various fares in operation (single and return) and also a punch, the tickets being issued in the same way as on motor omnibuses or tramcars. A considerable economy has been effected, as no staff is required at the intermediate stations except the signalling staff.

* * *

THE directors of the Southern Railway have sanctioned an order for two new cross-Channel steamers for the Southampton-Channel Island services. These new vessels will it is stated, surpass in comfort and accommodation any steamer hitherto put on between the mainland and the Channel Islands. They will be built by W. Denny Bros.

* * *

THE contract for the erection of the new L.N.E.R. station at Clacton-on-Sea has been awarded to John Wilmott & Sons Ltd., of Hitchin, Herts. Work has already commenced on the station buildings, which will comprise booking hall, parcels office, cycle and cloak rooms, together with an up-to-date refreshment room and bars, including kitchen and offices, all on the ground floor. Living accommodation has been provided for the station master and bedrooms and a sitting room for the waitresses on the first floor of the central block. The design of the building is of a modern type, but on the lines of late Renaissance. Part of the centre block is being carried out in stone and the remaining portion and the wings in red brick with stone dressings; the roofs will be covered with green slates. The whole of the buildings will be centrally heated. It is believed that this is the first station in Britain to be equipped with central heating.

* * *

THE use of an ornithological subject is something of a novelty where railway posters are concerned; and we anticipate smiles as well as keen interest when travellers on the "Met." catch a glimpse of the new coloured bill which has just been issued from Baker Street. For the chief feature thereof is our famous friend the Jackdaw of Rheims—and a very knowing bird he looks, too, a bird with a peculiarly bright, calculating eye and a plumage that suggests his close relationship to another famous fowl, viz.,

**A STRIKING METROPOLITAN POSTER.**

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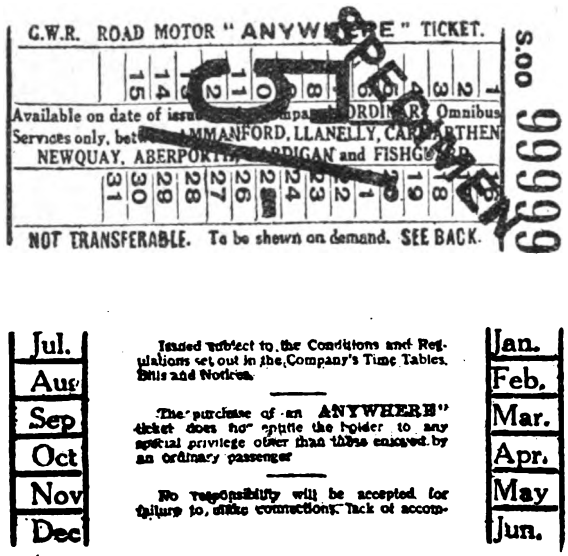
G.W.R. ROAD MOTOR "ANYWHERE" TICKET.
Available on date of issue
Services only, between
NEWQUAY, ABERPORTH
NOT TRANSFERABLE. To be shewn on demand. SEE BACK.
Jul.
Aug
Sep
Oct
Nov
Dec
Issued subject to the Conditions and Regulations set out in the Company's Time Tables, Bills and Notices.
The purchase of an ANYWHERE" ticket does not entitle the holder to any special privilege other than those enjoyed by an ordinary passenger
No responsibility will be accepted for failure to make connections, lack of accom-
Jan.
Feb.
Mar.
Apr.
May
Jun.

FACE AND REVERSE OF G.W.R. "ANYWHERE" BUS TICKET.

The front and back of an "Anywhere" Ticket.

FACILITIES were recently introduced, and have proved very popular with the public, whereby passengers, every Sunday, can travel any distance by any of the G.W.R. motor omnibuses within the limits of Ammanford, New Quay, Aberporth and Fishguard and Goodwick, at an inclusive fare of 5s. On these services, special through cars are run on Sundays between Ammanford, Cardigan and Fishguard, making connections at Groesffordd for New Quay and Newcastle Emlyn for Aberporth. These arrangements have necessitated a completely new departure as regards bell-punch tickets. On the "Anywhere" ticket, the 31 "stages" printed on the front represent the days of the month, and the ticket on being issued is bell-punched in the date and cancelled in the month, thus automatically determining the date upon which it is available.

* * *

THE L.N.E.R. announces that a new station will shortly be constructed between Kiveton Park and Waleswood. The station will be known as Kiveton Bridge and will serve the village of Wales, in South Yorkshire.

* * *

AN accelerated service between Cheltenham, Gloucester, Stroud and London by the 2.25 p.m. train from Cheltenham, extended from Cheltenham to Paddington, is officially announced by the Great Western Railway. The train, which is due at Paddington at 5.30 p.m., gives an acceleration of 45 min. over the service hitherto in operation.

* * *

THE Southern Railway is installing a periscope device in a number of guards' vans to enable the guards to observe the signals ahead while the train is in motion. The device consists of two mirrors, one secured on a table at which the guard sits, and the other a few inches above the roof of the van, both placed at an angle of 45 deg.

* * *

A THROUGH L.M.S.R. freight express train, vacuum fitted, is now run from London to Chester and Birkenhead. The new service leaves London at 9.30 p.m. each

the Blue Bird (of happiness). As will be seen from the accompanying reproduction, the poster happily typifies the jackdaw's delight in finding, on his first visit to London, a Metropolitan Railway season ticket. Colouring and design are alike good, and the bill is sure to attract considerable attention.

* * *

IN certain instances mid-week excursions (on Tuesdays and Wednesdays) all the year round are now in operation on British railways, in addition to those at the week-end already announced. The mid-week excursions will be available for eight or fifteen days.

* * *

THE L.N.E.R. reports that during the past pigeon-flying season 656 vanloads of baskets of pigeons were conveyed in 28 special trains in connection with the Up North Combine Races. Some of the birds were sent as far as Amiens *via* Folkestone, a distance of 343 miles.

* * *

THE Great Southern Railways Company of Ireland has issued an attractive set of four coloured picture posters designed by Mr. Walter Till and printed by the Kingsway Publishing Company, for exhibition in Great Britain, France, Germany, and Holland, the letterpress on each being in the language of those countries. The poster in English is entitled "The Fisherman's Paradise"; that in French depicts a typical view of Glengariff, Killarney; that in German shows Killiney Bay, Co. Dublin; whilst the Dutch poster illustrates the rural delights of Cunisfallen.

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night and arrives at Chester and Birkenhead in the early hours of the next morning.

* * *

By providing a rail motor halt at Brook Road, Twerton, between Bath and Saltford on the old London to Bristol main line, the Great Western Railway Company are actually restoring a pre-war facility. A station existed at Twerton, at a point about a quarter of a mile west of the site of the new halt, which is now in course of construction, from the early days of the Great Western line until the Great War.

* * *

On February 4 the Railway Club held its Annual General Meeting at its Headquarters, 57, Fetter Lane, E.C.4. Mr. Kenneth Brown, the President, was in the chair.

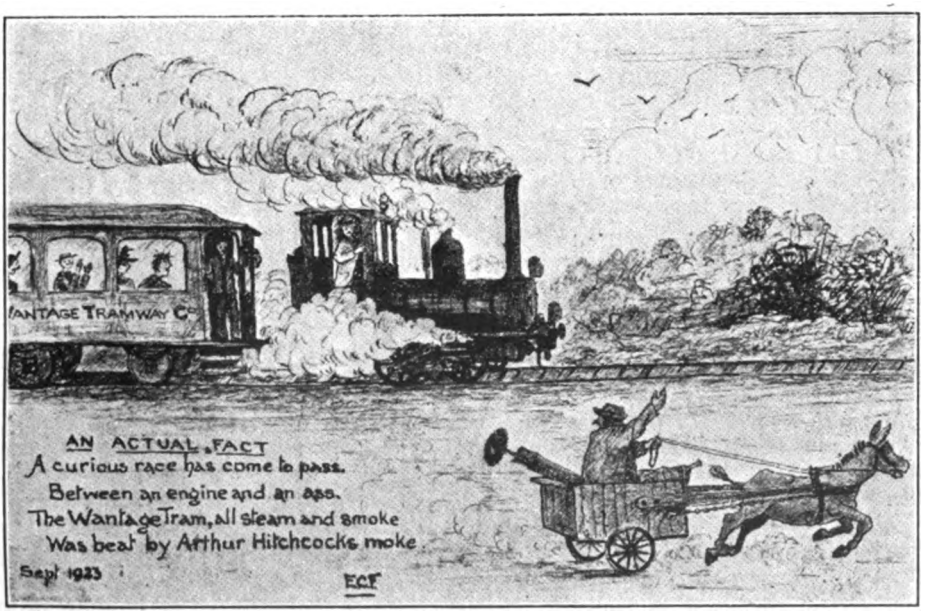
After the business of the evening had been successfully negotiated Mr. Kenneth Brown gave his inaugural Presidential Address, in which he dealt with the Financial Aspect of British Railways, considering in the main the grouping era. The effect of the present intensive road competition, the results of the first year's working of the standard rates, the comparative cost of British and Continental travel, the nominal and market value of capital stock, these and other points were all discussed, and each was made admirably clear by a series of diagrams. The President closed his remarks with a few suggestions as to the methods to be adopted to meet the difficulties which confront railways at the present time. A short discussion, in which a number of members took part, brought an interesting and instructive lecture to a close.

* * *

The London and North Eastern Railway announces that to provide further accommodation for the increasing traffic by the Harwich–Hook of Holland route to the Continent, an order for two more twin-screw geared turbine passenger steamers has been placed with John Brown and Company, Clydebank, Glasgow. These two vessels are in addition to an order placed with the same firm for a new vessel as recently as April last. The designs include numerous improvements.

* * *

Commenting upon references in the November number to the rhyme relating to a race between the Wantage tram and an ass, Mr. R. Abbott sends a copy of the postcard on which this appeared, published in Wantage in the early days of the tramway. This is reproduced. He also sends, in reference to a "Why and the Wherefore" in the December number, a photograph of one of the old Brighton "Terrier" engines which were sold to the Edge Hill Light Railway. In regard to the latter, Mr. Abbott states, on the basis of a visit to the line in August last, that both engines of this class were standing at the foot of the cable-worked incline from the top of Edge Hill to the main line. Both were in good


ANTAGE TRAMWAY C°
AN ACTUAL FACT
A curious race has come to pass.
Between an engine and an ass.
The Wantage Tram, all steam and smoke
Was beat by Arthur Hitchcocks moke
Sept 1923
ECF

**OLD WANTAGE TRAMWAY HUMOROUS POSTCARD.**

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**MORRIS 10-CWT. VAN SPECIALLY ADAPTED FOR ADVERTISING DEPARTMENT REQUIREMENTS, SOUTHERN RAILWAY.**

condition and covered with tarpaulins, though some of the fittings had been removed. There were also several stone trucks in the sidings, and about 200 yards down the line towards Kineton a brake van was standing.

* * *

AT the annual general meeting of the Wimbledon and District Model Railway Club, the following officers were elected for 1929:—President, Mr. H. Greenly, A.I.Loco.E.; Vice-President, Mr. W. H. Shephard; Hon. Secretary, Mr. R. Shephard; Hon. Assistant Secretary, Mr. H. C. Wardle; Committee, Messrs. A. R. Walkley, S. Warren, C. F. Klapper, G. P. Keef; Hon. Librarian, Mr. G. B. Creer. The following were elected Foundation Members:—Messrs. T. B. Stoakley, R. Shephard, and A. Farley. The following meetings may be noted:—Red Cross Hall, Church Road, S.W.19. 7.45 p.m., March 4, Track-night, Monthly Competition, Rummage Sale, and practical demonstration with "controlled clockwork" locomotives, by Mr. Walker (of Baker Street); March 18, lecture on "Locomotive Coaling Plants" (Mitchell Conveyor Company).

* * *

THREE hundred and fifty-seven station in England and Wales entered for the L.M.S.R. 1928 Station Gardens Competition, an increase of 35 over 1927. The six special prizes were awarded to Alcester, Broxton, Charfield, Lichfield T.V., Ockendon and Penns, all of whom, with the exception of Lichfield T.V., were similarly successful last year. Out of 195 entries in Scotland, special prizes were secured by Alyth Junction, Maxwelltown, Racks, St. Fillans, Wemyss Bay, West Kilbride.

* * *

THE L.N.E.R. recently conveyed a complete zoo by special train from Leeds to Glasgow. The special consisted of 17 vans of wild animals (including camels, elephants, zebras, snakes, birds, monkeys, &c.), five caravans and stores and a motor tractor, the total weight being 515 tons. Many of the cages and caravans were so bulky that the special had to be run at a restricted speed, and stops made at intervals for examination.

* * *

A VIEW is reproduced on this page of a Morris 10-cwt. motor-van supplied by Stewart & Ardern, to enable the staff of the Southern Railway Advertising Department to make a systematic weekly tour of the London suburban area for cleaning and

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maintaining the numerous green and white enamel direction signs which are now a familiar sight in S.W., S.E., and S. London. The body was specially built for its intended purpose, the design being prepared by Mr. R. E. L. Maunsell, Chief Mechanical Engineer, in conjunction with the Advertising Department. The most unusual feature is the platform top for carrying medium-sized enamel plates from the central London depot to wherever they may be required. Inside is an extension ladder and various special fitments. The bodywork is painted green, and the chassis and wheels red, the standard colours for Southern Railway road vehicles.

* * *

THE longest railway tunnel in the United States—one which pierces the Cascade range of hills 100 miles east of Seattle, Washington—has been opened for traffic The new tunnel is 8 miles long. On the same day the entire stretch of railway line through the Cascades, representing about 75 miles of permanent way, was finally transformed for electrical operation.

* * *

FOR some time past experiments have been in progress with the conveyance of goods to and from the Continent *via* Goole and *via* Tilbury and Dunkerque. As a result, an organisation has been set up to deal with the transit of goods by containers and road-rail wagons on an extended scale. Such services are therefore now available *via* the Port of Goole to Amsterdam, Rotterdam, Antwerp, Ghent, Hamburg and Dunkerque to cater for the main Continental hinterland, and to Copenhagen for distribution in Denmark, while *via* Tilbury, in conjunction with the A.L.A. Steamship Company, a container service is being operated to Dunkerque for France, Switzerland, Italy, &c.

* * *

CONSEQUENT upon the continued popularity of the cheap day return tickets—6d. third class and 9d. first class—between all their stations in Birkenhead and Liverpool the Mersey Railway has removed the 10 a.m. restriction and now issues the tickets by all trains daily. This extension also applies to the local cheap day tickets between their stations in Birkenhead and the through cheap day tickets to and from stations on the Birkenhead Joint Lines up to Chester, &c., and on the Wirral line to West Kirby and New Brighton. The Mersey Railway has also introduced between its stations in Liverpool and Birkenhead a new type of cheap "six-day" ticket, which is available for one return journey each week-day, Monday to Saturday.

* * *

THE *Yorkshire Evening News* directs our attention to the fact that Mr. H. Robinson, employed at Wellington station, Leeds, is able to speak six languages and read and write 14 others.

* * *

HAVING come to England *via* the Harwich-Zeebrugge train ferry for their season at Earl's Court, Bostock's Circus returned *via* the same route.

* * *

LIEUT.-COL. A. H. L. MOUNT'S report to the Ministry of Transport on the head-on collision at New Tredegar Colliery, G.W.R., on October 9, has been issed. The colliers' train was hauled by 0-6-2T No. 76, and the passenger train by 0-6-2T No. 1668. Primary responsibility is placed upon the signalman, of whose action a serious view is taken, though the driver who failed to observe the danger indication of the up home signal is also blamed.

* * *

THE problem set in the January number by Mr. G. A. Pearson is answered by the 6.31 p.m. train from Edinburgh to Aberdeen, L.N.E.R. In the summer, this included portions off the 10 and 10.5 a.m. expresses from King's Cross and the 9 a.m. from St. Pancras. A restaurant car section is added at Edinburgh, while a Glasgow portion is attached at Dalmeny. It was not, however, until January 19 that the first reader to solve this problem, Mr. W. B. Sotheron Estcourt, despatched his letter—*from Uganda!*

* * *

MR. R. F. KEMBALL points out that through carriages are now run between Clacton-on-Sea and Walton-on-the-Naze by several services, though this involves a reversal at Thorpe-le-Soken.

* * *

"SENTINEL-CAMMELL" steam rail cars of the articulated type have been built for service on the Palestine and Hedjaz Railways. Some of these cars will run on the usual standard gauge and others on the 3-ft. 6-in. gauge, provision being made for alteration if and when need arises.

* * *

A NEW double-ended oil-engine motor-car ferry-boat has recently been delivered to Portsmouth by the builders, William Denny & Bros, Ltd., of Dumbarton, for service

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on the Southern Railway's Portsmouth-Fishbourne-Isle of Wight motor-car ferry service. The vessel is named the *Wootton*, and is generally similar to the *Fishbourne*, built for the Southern Railway last year, but incorporates a number of detail improvements, while an increase has been made in the amount of electric power on board. She will be able to carry about 20 motor-cars, in addition to motor-cycles, sidecar combinations and baggage.

* * *

A RETURN issued by the L.M.S.R. shows a remarkable increase in the number of half-day excursion trains run during 1928. The 1927 total of 3,444 trains carrying 1,300,000 passengers grew in 1928 to 5,000 trains carrying 1,900,000 passengers. These excursions, which are run at exceptionally cheap fares, are proving a highly successful source of revenue.

* * *

THE Southern Railway announces further improvements in the cross-Channel steamers on the Newhaven-Dieppe route. The *Paris* has already been provided with a glass-sided shelter deck, and the *Versailles* is being fitted in similar manner. The new shelter deck on these vessels will be like that of the oil-burning steamer *Worthing*, the latest vessel on this service.

* * *

WHAT is said to be the biggest single unit of electrical equipment transported by rail in this country completed the first stage of its journey from Newcastle to South Wales at Doncaster on December 16 last. It is a stator, weighing 105 tons, built by C. Parsons & Co., of Heaton, for the South Wales Power Distribution Company at Treforest. It is 16 ft. 3 in. long, 11 ft. 3 in. wide, and 10 ft. 11 in. high. It was transported by two L.N.E.R. trolleys, two 60-ton flat wagons taking the cantilever weight giving a spring balance to the load. The stator is 13 ft. 5 in. above rail level, and out of gauge on both sides. A week later it went forward to Nottingham, and thence to Banbury, where it was transferred to the Great Western Railway for the final stage of its journey.

* * *

THE London & North Eastern Railway Musical Society gave its 148th concert in the Hamilton Hall of the Liverpool Street Hotel on January 9. Miss Rhoda F. Whitelaw, daughter of Mr. William Whitelaw occupied the chair.

* * *

OWING to the increase in the number of L.N.E.R. motor vehicles in the London Area, the directors at a recent meeting authorised a scheme for the establishment of motor vehicle repair shops at Holloway for heavy repairs, and extension of garage accommodation, with facilities for light repairs at King's Cross.

* * *

MR. E. KILBURN SCOTT, Hon. Secretary, advises us that a book of 130 pages, dealing with Matthew Murray, one of the pioneers of locomotive engineering, will shortly be published; cloth covers, 3s. 6d., cardboard covers, 2s. 6d. Proceeds resulting from its sale are to be devoted to the Matthew Murray Memorial scheme, which includes, besides the book in question, the proposed erection of memorial tablets (*a*) on the site of the "Round Foundry," Holbeck, Leeds, (*b*) on a site to be arranged in Leeds, and (*c*) in the Institution of Mechanical Engineers' building in London. Further action is contemplated if funds permit, and Mr. G. S. Wainwright, Hon. Treasurer, 5, Allerton Avenue, Moortown, Leeds, will be pleased to receive subscriptions.

* * *

PRESIDING at the annual dinner at Bath of the General Offices staff of the Somerset and Dorset Joint Railway, the Traffic Superintendent (Mr. G. H. Wheeler, M.B.E.) mentioned that a Suggestions Department has been adopted on that line.

* * *

THE second number of the *Railway Newsletter* has now been issued, and maintains in general the same character as the first issue, with which we dealt in detail in the February number. It includes an article on the speeding-up of freight traffic; further notes on the advantages of the "container" system in providing for door-to-door services; some notes on negotiations in progress between the railways and road transport agencies, including the formation of "The Western National Omnibus Co. Ltd."; the magnitude of the railway industry in Great Britain, described as "A Twelve Hundred Million Concern"; and an explanation of fog-signalling methods under the heading "How it Works." In other sections it is pointed out that 90,000,000 tons per annum pass through railway-owned docks, and some notes are given as to the railway exhibits which will appear in the British Industries Fair, and which will take the form in each case of a loaded container or road-rail truck. There are also several miscellaneous items of general interest.

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THE RAILWAY MAGAZINE.]

**DOWN "ROYAL SCOT" EXPRESS PASSING RUGBY.**

**Four-cylinder 4-6-0 No. 6134 "ATLAS."**

**(From a photograph by H. Gordon Tidey.)**

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# The World's Greatest Suburban Electrification.

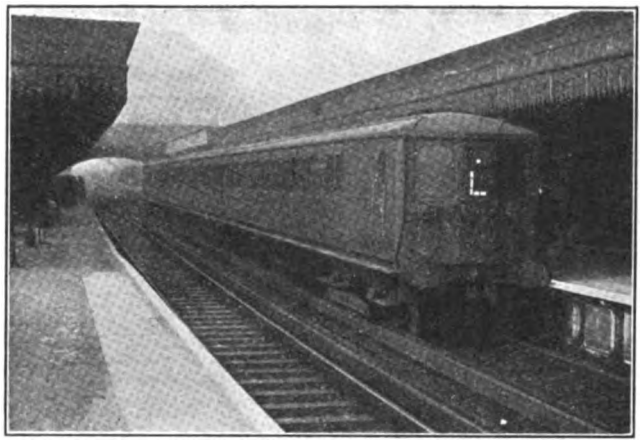

*Photo.*] [*R. W. Airy.*

LONDON BRIDGE-DORKING NORTH TRAIN AT SUTTON.

THE inauguration, on March 3, of direct-current third-rail electric traction on further routes and the conversion of other routes previously operated on the alternating current overhead system, represents the completion of a further stage of the great scheme whereby the Southern Railway has to its credit what is believed to be "The World's Greatest Suburban Electrification." This result has, of course, been achieved only in stages, and has been complicated by the fact that, in order to obtain a uniform system, it was necessary to provide for the conversion to direct current operation of lines previously worked on the alternating-current overhead system. It was, however, realised a few years ago that this conversion must be undertaken, and the cost has necessarily had to be included in the expenditure of over £11,500,000, which the scheme as now realised has involved. The great programme involved has, however, now reached fruition, and except for the temporary retention of a degree of alternating-current overhead working pending the delivery of all the new and adapted rolling stock required—a matter of a few months only—all suburban routes having any substantial passenger traffic importance can now be worked by standard third-rail direct-current electric trains operated, in most cases, on regular-interval and frequent schedules.

The map reproduced shows that the suburban system concerned constitutes one of the most elaborate and complex networks of lines to be found anywhere, while the fact that some 748 track miles —about 264 route miles—are concerned, indicates the magnitude and importance of this great undertaking. Necessarily, the system has been built up in several stages, but there is no need to give them in detail, as all information in this connection is given very clearly on the specially-prepared map reproduced on page 254. In the main, all essential particulars have been included in previous articles, and in view of the extensive attention which has thus been given to the matter, there is no occasion to go into close detail in regard to technical features of the equipment. There are, however, certain items which call for a few remarks.

Several of these have already received detailed attention, so that it will be sufficient to recall them, though they all constitute factors leading up to the realisation of the complete scheme as now brought to fruition. In this class may be mentioned the new track lay-out on Cannon Street railway bridge, between Charing Cross and London Bridge, and between London Bridge and New Cross Gate, with station improvements and alterations and new signalling (colour light) on those sections, also on the Holborn Viaduct line. The new station at South Bermondsey, the extensive improvements at Tulse Hill, and minor works at Purley, may also be indicated, while the rebuilding of the L.S.W. station at Wimbledon has some relation to the main scheme, as certain of the new platforms have been provided for the amplified train service which Wimbledon now has from Holborn Viaduct (Victoria on Sun-



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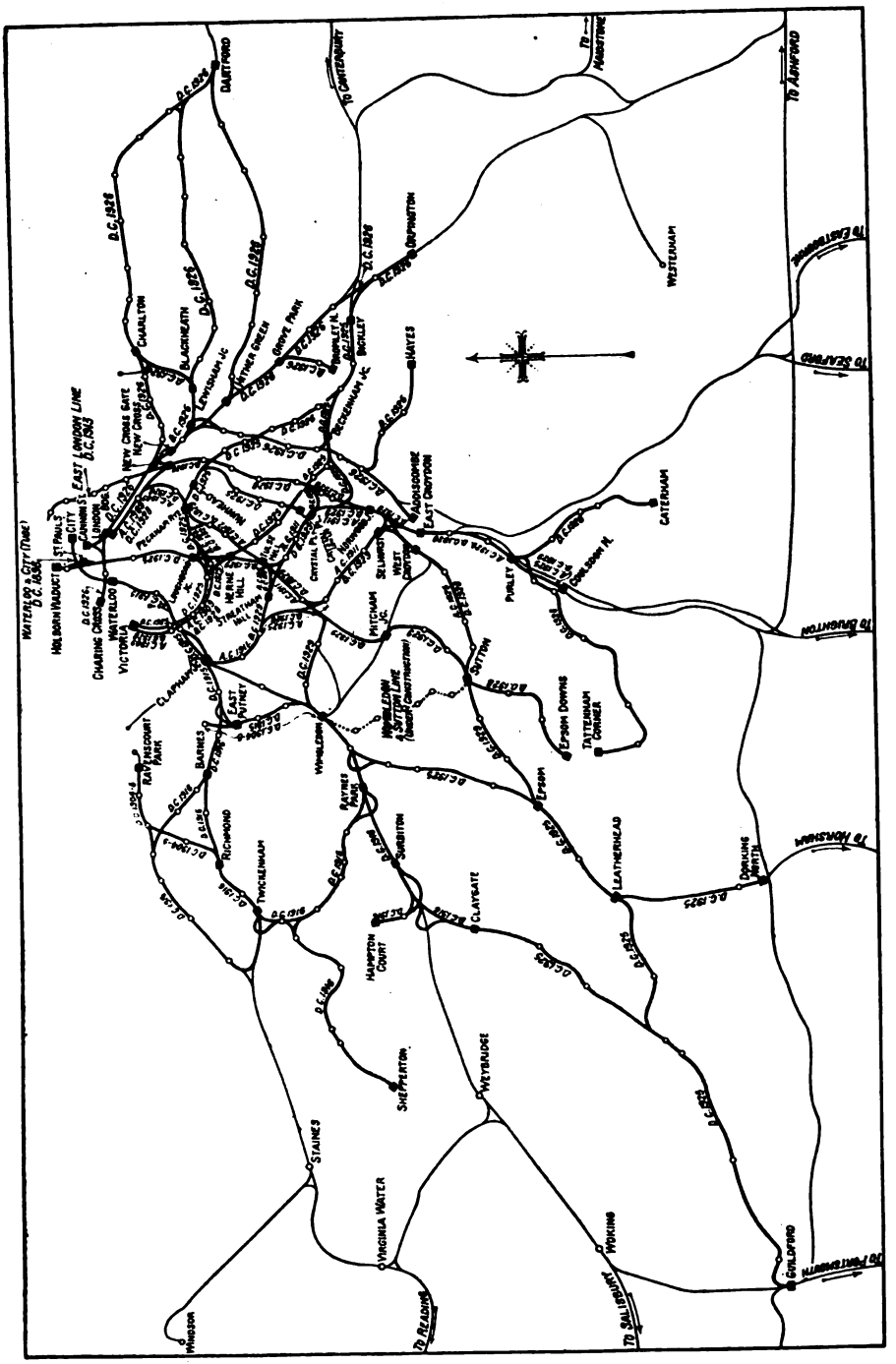
WATERLOO & CITY (Tube)
D.C. 1898
HOLBORN VIADUCT
CHARING CROSS
WATERLOO
VICTORIA
CITY
ST PAUL'S
LONDON BRIDGE
EAST LONDON LINE
D.C. 1913
NEW CROSS GATE
NEW CROSS
CHARLTON
BLACKHEATH
LEWISHAM
DARTFORD
HITHER GREEN
GROVE PARK
BROMLEY N.
BROMLEY
ORPINGTON
TO CANTERBURY
TO HASTINGS
TO ASHFORD
HAYES
ADDISCOMBE
EAST CROYDON
CATERHAM
WESTERHAM
PURLEY
CHERTSEY
TO EASTBOURNE
TO SEAFORD
TO BRIGHTON
CLAPHAM JUNCTION
WANDSWORTH
CENTRAL
CLAPHAM
WEST CROYDON
SELHURST
NORBURY
PENGE
BECKENHAM JC.
HERNE HILL
STREATHAM HILL
BRIXTON
CRYSTAL PALACE
NORWOOD JC.
MITCHAM JC.
MITCHAM
SUTTON
EPSOM DOWNS
TATTENHAM CORNER
WIMBLEDON
WIMBLEDON & SUTTON LINE (Under Construction)
EAST PUTNEY
BARNES
RAVENSCOURT PARK
RICHMOND
TWICKENHAM
KINGSTON
SURBITON
RAYNES PARK
EPSOM
LEATHERHEAD
CLAYGATE
HAMPTON COURT
SHEPPERTON
WEYBRIDGE
STAINES
VIRGINIA WATER
WINDSOR
TO READING
WOKING
TO SALISBURY
GUILDFORD
TO PORTSMOUTH
D.C. 1915
D.C. 1916
D.C. 1918
D.C. 1923
D.C. 1925
D.C. 1926
D.C. 1927
D.C. 1928
D.C. 1929
D.C. 1930
D.C. 1931
D.C. 1932
D.C. 1933
D.C. 1934
D.C. 1935
D.C. 1936
D.C. 1937
D.C. 1938
D.C. 1939
D.C. 1940
D.C. 1941
D.C. 1942
D.C. 1943
D.C. 1944
D.C.

days) and in view of the imminent opening of a section of the Wimbledon and Sutton line.

There are also several new works which are directly associated with the final stages of electrification now under consideration. Among these, the following may be specifically mentioned :—

(*a*) New connections at Victoria to facilitate the working of the new train services.

(*b*) Lengthened platforms and minor improvements at Battersea Park, Tooting Junction, Haydon's Road, Hackbridge and Ewell East.

(*c*) Reconstruction of late L.S.W.R. Epsom station to enable Epsom Town (L.B.S.C.R.) to be closed. This has necessitated entire rebuilding. Originally there were two outer platforms used by trains to and from Waterloo, while Central Section trains ran through the middle lines without platforms. Now, however, there are two island platforms, respectively up and down. One receives Central Section trains from the Mitcham Junction direction on its outer face, Western Section trains from Waterloo using the inner face. The other serves up Central Section trains on its inner face and up Waterloo trains on its outer face. Passengers can thus interchange without changing platforms for journeys in the same direction of travel, while two trains can enter or leave the station, as the case may be, at the same time, on the respective routes. Trains continuing beyond Epsom converge after leaving station limits on what used to be the Epsom and Leatherhead Joint line, the dual ownership of which explained the peculiar lay-out of the old station and the existence of separate stations to serve Epsom itself. There are also new berthing sidings and connections to enable trains on either route to be returned immediately to London instead of continuing to Leatherhead and beyond. It may also be mentioned that some time ago new connections were put in at Leatherhead to enable the L.S.W. station to be closed (it is now used for stabling empty sets) and all traffic worked through the L.B.S.C. station.

(*d*) Restoration of old branch from Crystal Palace (Low Level) to Beckenham Junction. This includes the raising of part of the old L.C.D.R. main line at this point to enable the S.E.R. Addiscombe Road line to be raised so as to overcome drainage difficulties, the laying-in of independent lines for trains from the Crystal Palace through to Beckenham Junction station, and the provision of an additional bay platform at that station for these trains without affecting main-line train movements.

(*e*) It may be mentioned at this stage that it is proposed to open a portion of the Wimbledon and Sutton line in a few months' time, and the electric trains from Holborn Viaduct (Victoria on Sundays) will then be continued through without affecting Western Section main-line traffic. This explains why one side only of the Tooting Junction-Wimbledon loop has been equipped.

The general idea of regular-interval trains on the various routes is applied very systematically, the usual rule being 20-minute services at busy periods and 30-minute intervals at other times and on Sundays. In one or two instances, however, there are trains at 20-minute intervals during the quiet hours also, this applying particularly to the older-established trains from Waterloo to Epsom alternatively to Dorking North or Effingham Junction, and to the combined London Bridge-Caterham and Tattenham Corner trains, which, outside the busy hours, serve intermediate stations between East Croydon and Purley so as to avoid the necessity for running London Bridge-Coulsdon North trains, connections with the Victoria-Coulsdon North trains enabling passengers to reach Coulsdon North, other facilities being available *via* Norwood Junction or East Croydon.

The principal new services may be thus set forth :—

(1) Holborn Viaduct and St. Paul's to Wimbledon, *via* Herne Hill, Tulse Hill and Haydon's Road, at 20 or 30 minute intervals, in place of the irregular and sometimes widely-spaced services hitherto operated. On Sundays, the trains run from Victoria, *via* Herne Hill, at slightly irregular half-hourly intervals, except that there are two evening services in each direction running from and to Holborn Viaduct instead of Victoria. The usual arrangement is that trains leave Holborn Viaduct at 14 and 44 min. past the hour



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| Services. | Route. | Code. |
|---|---|---|
| Charing Cross and Tattenham Corner .. | — | S |
| Charing Cross and Caterham .. .. | — | L |
| Cannon Street and Tattenham Corner .. | — | S |
| Cannon Street and Caterham .. .. | — | L |
| London Bridge and Tattenham Corner .. | — | T |
| London Bridge and Caterham .. .. | — | H |
| Purley and Caterham (shuttle service only) | — | P |
| Purley and Tattenham Corner (shuttle service only) | — | P |
| London Bridge and Coulsdon North .. | Forest Hill .. .. .. .. .. | I |
| London Bridge and Coulsdon North .. | Tulse Hill and Crystal Palace .. .. .. | I |
| London Bridge and Dorking North .. | Mitcham Junction .. .. .. .. | L |
| London Bridge and Effingham Junction | Mitcham Junction .. .. .. .. | L |
| London Bridge to London Bridge .. | Sydenham, Crystal Palace and Tulse Hill .. | P |
| London Bridge to London Bridge .. | Tulse Hill, Crystal Palace and Sydenham .. | P |
| London Bridge and Epsom .. .. | Norwood Jct. and West Croydon .. .. | A |
| London Bridge and Epsom Downs .. | Norwood Jct. and West Croydon .. .. | O |
| London Bridge and Wallington .. .. | Norwood Jct. and West Croydon .. .. | O |
| London Bridge to London Bridge .. | Norwood Jct., Thornton Heath, Tulse Hill .. | V |
| London Bridge to London Bridge .. | Tulse Hill, Thornton Heath and Norwood Jct. | V |
| London Bridge to Victoria .. .. | South London Line .. .. .. .. | H |
| London Bridge to Victoria .. .. | Tulse Hill and Streatham Hill .. .. .. | T |
| London Bridge and Streatham Hill .. | Sydenham and Crystal Palace .. .. .. | A |
| East Croydon and Victoria .. .. | Selhurst and Streatham Common .. .. | T |
| Holborn and Wimbledon .. .. .. | Herne Hill, Tulse Hill .. .. .. .. | H |
| Victoria and Beckenham Junction .. | Streatham Hill and Crystal Palace .. .. | P |
| Victoria and Coulsdon North .. .. | Streatham Common and East Croydon .. | I |
| Victoria and Crystal Palace .. .. | Streatham Common, Selhurst and Norwood Jct. | H |
| Victoria to Epsom and Dorking North .. | Mitcham Junction .. .. .. .. | V |
| Victoria and Wimbledon .. .. .. | Herne Hill and Tulse Hill .. .. .. | I |
| Victoria to London Bridge .. .. | Streatham Hill and Tulse Hill .. .. .. | T |
| Victoria to London Bridge .. .. | South London Line .. .. .. .. | H |
| Victoria and East Croydon .. .. | Streatham Hill and Crystal Palace .. .. | T |
| Victoria and Sutton .. .. .. | Streatham Common and West Croydon .. | S |
| Victoria and West Croydon .. .. | Streatham Hill and Crystal Palace .. .. | P |

The following are the usual codes which continue in use when A.C. Electric Trains still remain in service:—

No. 3. Norwood Junction and Victoria, *via* Crystal Palace.
No. 6. Victoria and East Croydon.
No. 7. Victoria and Selhurst *via* Streatham Common.
No. 9. Victoria and Sutton *via* Streatham Common.
No. 11. Victoria and Coulsdon North *via* Streatham Common.

## HEAD CODES OF CENTRAL SECTION ELECTRIC TRAINS.

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in the case of half-hourly trains, and at 14, 34 and 54 min. at busy periods. On Sundays, the departures from Victoria are at about 20 and 50 min. past the hour, the exceptions from Holborn Viaduct leaving at 6.45 and 8.45 p.m.

(2) London Bridge, *via* Tulse Hill and Mitcham Junction, to Epsom and on to Dorking North and Bookham and Effingham Junction. These trains leave London Bridge at 8, 28 and 48 min. past the hour at busy periods, and at 24 or 53 min. past the hour at other periods. On Sundays, the standard departure times on this route are 25 and 55 min. past the hour.

(3) Victoria and Epsom, *via* Mitcham Junction. These trains leave, at busy times, at 16, 38 and 58 min. past the hour and, at quieter periods, at 20 and 50 min. past the hour. On Sundays the standard departure times are 15 and 45 min.

The combined result of these facilities is that at Epsom, taking as an example the period from 5 to 6 p.m. (not on Saturdays) a train from London Bridge arrives at 5.5 and proceeds to Dorking North; it is followed by:—5.11 from Victoria, terminating; 5.16 Waterloo to Effingham Junction; 5.25, London Bridge to Dorking North; 5.29 from Victoria, terminating; 5.37, Waterloo to Dorking North; 5.45, London Bridge to Bookham; 5.50 from Victoria, terminating; 5.56, Waterloo to Dorking North. At quieter periods, taking as the specimen hour 8 to 9 p.m., the times are as follow:—8.5, London Bridge to Dorking North; 8.16, Waterloo to Effingham Junction; 8.23 from Victoria terminating; 8.29, London Bridge to Effingham Junction; 8.36, Waterloo to Dorking North; 8.48 from Victoria terminating; 8.56, Waterloo to Dorking North. On Sundays, a specimen hour is:—9.6, Waterloo to Effingham Junction; 9.19 from Victoria, terminating; 9.31, Waterloo to Effingham Junction and Guildford; 9.36, London Bridge to Dorking North; 9.49 from Victoria, terminating; 9.51, Waterloo to Dorking North.

On the Crystal Palace route the new service provides for trains from Victoria at 0, 14, 20, 34, 40 and 54 min. past each hour, those at 0, 20 and 40 continuing from Crystal Palace to Norwood Junction and West Croydon, and those at 14, 34 and 54 running instead to Beckenham Junction on the new service. At quiet hours the usual arrangement is: 10 and 40 to West Croydon and 28 and 58 to Beckenham Junction. On Sundays the trains run at 10 and 40 to West Croydon and at 27 and 57 to Beckenham Junction.

It will be of interest to summarise the resulting combination of electric train services at London Bridge and Victoria. The code letters which are now to be used appear on page 256.

### I.—LONDON BRIDGE

*A.—Busy Hours.*

2–22–42 Fast to Norwood Junction, West Croydon, Sutton and Epsom Downs.
5–25–45 Fast to Norwood Junction, East Croydon and Coulsdon North.
5–25–45 Tulse Hill, Selhurst, Norwood Junction and back to London Bridge direct.
7–27–47 Forest Hill and Crystal Palace.
8–28–48 Tulse Hill, Streatham, Mitcham Junction, Sutton, Epsom and Dorking North or Effingham Junction.
10–30–50 Tulse Hill, Streatham Hill, Clapham Junction and Victoria.
11–31–51 Norwood Junction direct, Selhurst, Tulse Hill and back to London Bridge.
15–35–55 Tulse Hill and Crystal Palace.
17–37–57 Peckham Rye, Denmark Hill, Battersea Park and Victoria.
16–36–56 East Croydon, Purley, Caterham and Tattenham Corner.

*B.—Quiet Hours, Weekdays.*

0–30 Tulse Hill and Streatham Hill.
2–32 Norwood Junction direct, West Croydon, Sutton, Epsom Downs.
8–38 Norwood Junction direct, Selhurst, Tulse Hill and back to London Bridge.
11–31–51 East Croydon, Purley, Caterham and Tattenham Corner. (These trains actually start from Charing Cross and call intermediately between East Croydon and Purley and connect with Victoria-Coulsdon North trains.)
12–42 Tulse Hill, Selhurst, Norwood Junction and back to London Bridge direct.
15–45 Tulse Hill and Crystal Palace.
18–48 Peckham Rye-Denmark Hill, Battersea Park and Victoria.
23–53 Forest Hill and Crystal Palace.
24–53 Tulse Hill, Mitcham Junction, Sutton, Epsom, Dorking North or Effingham Junction.

*Sundays.*

0–30 East Croydon, Purley, Caterham and Tattenham Corner. (These trains call intermediately between East Croydon and Purley and connect with Victoria-Coulsdon North trains.)
5–35 Forest Hill and Crystal Palace.
6–36 Tulse Hill and Crystal Palace.



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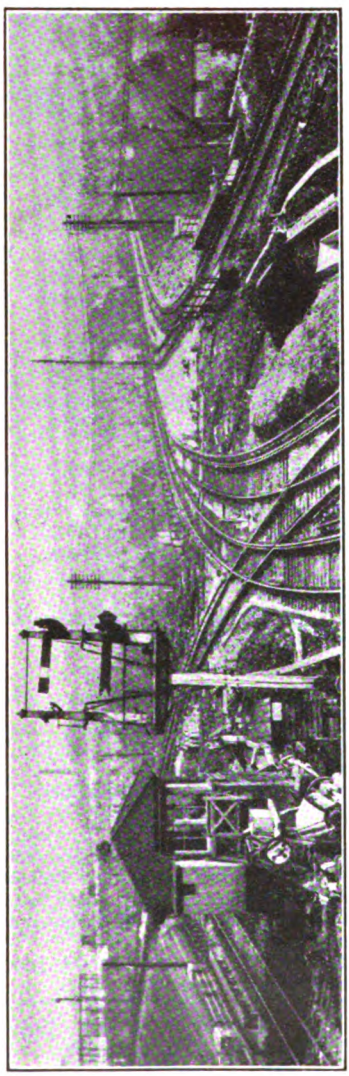
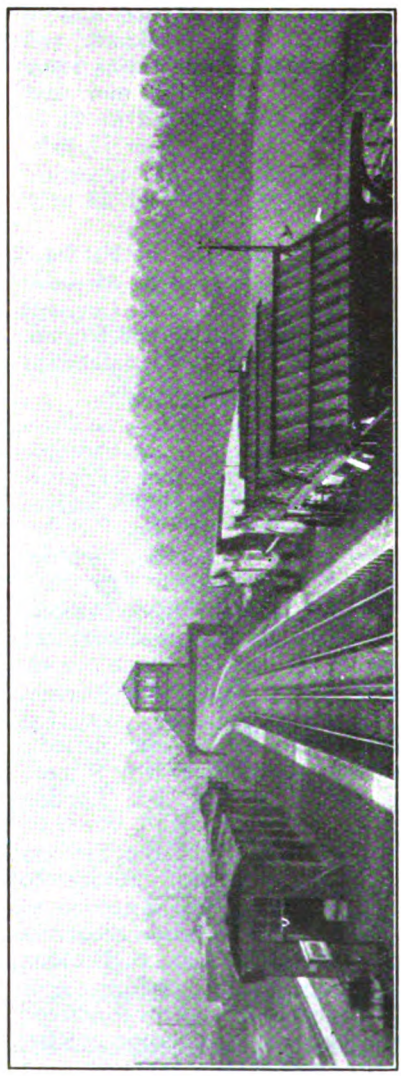


EPSOM STATION, SHOWING NEW CONNECTIONS.



EPSOM STATION, SHOWING NEW SIGNAL-BOX AND PLATFORMS.

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13–43 Norwood Junction direct, Selhurst, Tulse Hill and back to London Bridge.
15–45 Tulse Hill, Selhurst, Norwood Junction and back to London Bridge.
21–51 Peckham Rye-Denmark Hill, Battersea Park and Victoria.
25–55 Tulse Hill, Mitcham Junction, Sutton Epsom, Dorking North or Effingham Junction.
28–58 Norwood Junction direct, West Croydon, Sutton, Epsom Downs.

II.—VICTORIA.

*A.—Busy Hours, Weekdays.*

0–20–40 Streatham Hill-Crystal Palace-Norwood Junction-W. Croydon.
4–24–44 Fast to Norbury-Selhurst (occasional).
5–25–45 Streatham Hill.
11–31–51 Streatham Common-Selhurst-E. Croydon and Coulsdon North.
14–34–54 Streatham Hill-Crystal Palace-Beckenham Junction.
16–36–56 or 18–38–58 } Mitcham Junction-Sutton-Epsom.
18–38–58 Streatham Common-Selhurst-W. Croydon-Sutton.

*B.—Quiet Hours, Weekdays.*

8–38 Streatham Common, Selhurst, West Croydon-Sutton.
10–40 Streatham Hill-Crystal Palace-Norwood Junction-W. Croydon.
21–51 Streatham Common-Selhurst-E. Croydon-Coulsdon North.
20–50 Mitcham Junction-Sutton-Epsom.
28–58 Streatham Hill-Crystal Palace-Beckenham Junction.

*Sundays.*

4–34 Streatham Common-Selhurst-E. Croydon-Couldson North.
10–40 Streatham Hill, Crystal Palace, Norwood Junction-W. Croydon.
15–45 Mitcham Junction-Sutton-Epsom.
18–48 Streatham Common-Selhurst-W. Croydon Sutton.
27–57 Streatham Hill-Crystal Palace-Beckenham Junction.

It may be pointed out that of all these services only the following were or have ever been worked by alternating current overhead trains: (*a*) Victoria to London Bridge *via* South London Line; (*b*) Victoria to Crystal Palace, sometimes continuing to Norwood Junction but usually only to obtain access to Selhurst car sheds; (*c*) Victoria to Streatham Hill or on to London Bridge; (*d*) Victoria to West Croydon and Sutton; (*e*) Victoria to Coulsdon North; (*f*) London Bridge, reverse of (*a*); (*g*) London Bridge reverse of (*c*); and (*h*) London Bridge to Crystal Palace *via* Tulse Hill.

Seeing that the L.B.S.C.R. purchased current from the London Electric Supply Corporation Limited, and the same arrangement has been made for the Eastern Section electrification, together with the direct current Central Section routes equipped last year, it follows that all the new routes are similarly supplied, but through substations instead of at the various receiving stations installed for the alternating current conductors which receive current at alternating current high tension direct. The main direct current supply is therefore now received at Lewisham, which, besides being a substation, has been made the main supply point for all purchased traction current. Six out-going feeders from here supply the substations at Forest Hill, Norwood Fork, Purley, Kingswood and Warlingham, earlier in use, together with others later brought into use at Tulse Hill, Streatham and Sutton. There is also one at South Bermondsey, served from the feeders connecting Cannon Street substation with Lewisham.

The nine new substations are generally similar in design to the substations already in operation. With the exception of South Bermondsey, all the sub-stations are identical in layout, but the capacities vary from two to three machines. Forest Hill, Purley, Sutton, Kingswood, and Warlingham are two machine stations, with provision for an additional machine at the three first-named. Norwood Fork, Tulse Hill and Streatham are three-machine stations, with provision for an additional machine at each.

It should be mentioned that a complete new rotary converter equipment is being installed at the existing Clapham Junction substation, in order to deal with the increased load at this point. In each of the substations except South Bermondsey, Kingswood and Warlingham, a duplicate set of motor generators is being installed in order to provide a 440-volt, 75-cycle supply for signalling purposes. These machines, together with the necessary switchgear, are erected in an annexe at one end of the substation.

In addition to the track feeders installed in the new substations, low-tension feeders are provided between the existing Elmers End substations and the Norwood Spur



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*Photo.*] [*R. W. Airy.*

VICTORIA-EPSOM TRAIN APPROACHING SUTTON.

Line, and between Epsom substation and Epsom Downs passenger station.

The positive conductor rail is a standard 100-lb. per yard Vignoles section top contact rail throughout, generously bonded and insulated, with, of course, a considerable amount of special track cross-bonding, especially where track-circuit is laid and automatic, semi-automatic or power signalling is installed.

At Victoria considerable alterations to the permanent way have been made, to improve the approaches to platform Nos. 9-13. The inner home signals have been removed, and the outer home signals modified, so that a single semaphore, with "calling on" and "shunt" arms and a platform indicator, is provided for the up main and up local roads, and a ringed arm for the "carriage" line. At West Dulwich the signal box has been taken out of service, and the up and down starting signals worked electrically from Sydenham Hill and Herne Hill South respectively, on similar lines to the installation at North Dulwich.

*Rolling Stock.*

In order to meet the further requirements entailed by these new and "converted" services, it has, of course, been necessary to make considerable additions to the direct-current motor sets already in use, and these number 42 of the usual 3-coach units, and 22 2-coach trailer units. These correspond generally with the usual sets, but have been constructed or converted at Lancing and Ashford shops.

The electrical equipment is generally identical with that used on other electrified lines of the Southern Railway. Each motor coach is equipped with two 275-h.p. motors.

The new carriage shed at Selhurst is now, of course, completed and in service. It is 600 ft. long and 186 ft. wide, with 12 roads, each provided with a full-length inspection pit, the pit walls and the floor between the pits being of mass concrete. The roofing is in three bays. At intervals in the floor, plugging points for vacuum-cleaning plant connections and hydrants for hot and cold water are provided. The cleaning is carried out from small portable trolleys, which can be moved along between the roads as required; guard angles are provided in the floor to keep the trolleys clear of the coaches. A brick-built annexe consisting of offices, mess rooms, stores, &c., has been constructed for the staff. The equipment also includes 1-gallon oil pumps with underground tank, a battery of 250-gallon oil storage tanks with dispensing pumps and 20 waste soaking bins with two strainer boxes. The sheds used for the alternating current trains, together with the repair shops therefor at Peckham Rye, will, in due course, be adapted for dealing with the direct-current trains.

We are indebted to Sir Herbert Walker, K.C.B., General Manager; Mr. E. C. Cox, C.B.E., Chief Operating Superintendent; Mr. G. Ellson, O.B.E., Chief Engineer; Mr. R. E. L. Maunsell, C.B.E., Chief Mechanical Engineer; Mr. Herbert Jones, Electrical Engineer; and Mr. A. Raworth, Electrical Engineer (New Works) for co-operation in regard to the preparations of this article.

*Principal Contractors.*

Conductor rails: Dorman, Long & Co. Ltd.
Conductor rail insulators: Bullers Limited.
Conductor rail hook switches: Estler Brothers.
Low-tension cable lugs: Brecknell, Munro & Rogers Limited.
High-tension cables: Johnson & Phillips Limited.

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Copper bonds and terminals: British Insulated Cables Limited.
Electric train equipments: Metropolitan-Vickers Electrical Co. Ltd.
Bond compressors: Forest City Electric Co. Ltd.
Bond compressors: Estler Brothers.
High- and low-tension switchgear: British Thomson-Houston Co. Ltd., and English Electric Co. Ltd.
Substation cranes: Herbert Morris Limited.
10 kVA. motor generators and switchgear: Electromotors Limited.
Rotary converters and transformers: Swedish General Electric Limited.
Overhead trolleys, Selhurst Shed: Estler Brothers.
Couplers for overhead trolleys, Selhurst shed: Metropolitan-Vickers Electrical Co. Ltd.
Oil store equipment, Selhurst Shed: S. F Bowser & Co.
Substation lighting: Burdette & Co.
Air compressors: Electromotors Limited.
Substation buildings: Edwards Construction Company (South Bermondsey); Wallis & Sons (Lewisham Extension); J. W. Ellingham Limited (Streatham, Forest Hill, Norwood Fork, Tulse Hill, Sutton, Purley, Kingswood, Warlingham).
Cleaning and inspection shed at Selhurst: A. Jackaman & Son, Ltd.

BECKENHAM JUNCTION, SHOWING NEW PLATFORM.

By courtesy of Mr. E. C. Cox, Chief Operating Superintendent, we are enabled to give details of the head codes carried by Central Section electric trains, and for completeness this includes services previously in operation as well as new ones. It should be noted that rear portions of combined down Tattenham Corner and Caterham trains carry the through code from Purley and not the shuttle code.

**The Continuation of Mr. F. W. Brewer's Article on "Modern Locomotive Practice on the Great Western Railway" and the Completion of Mr. J. F. Gairns' article on "The Norfolk Lines of the L.N.E.R." are unavoidably held over until next month.**

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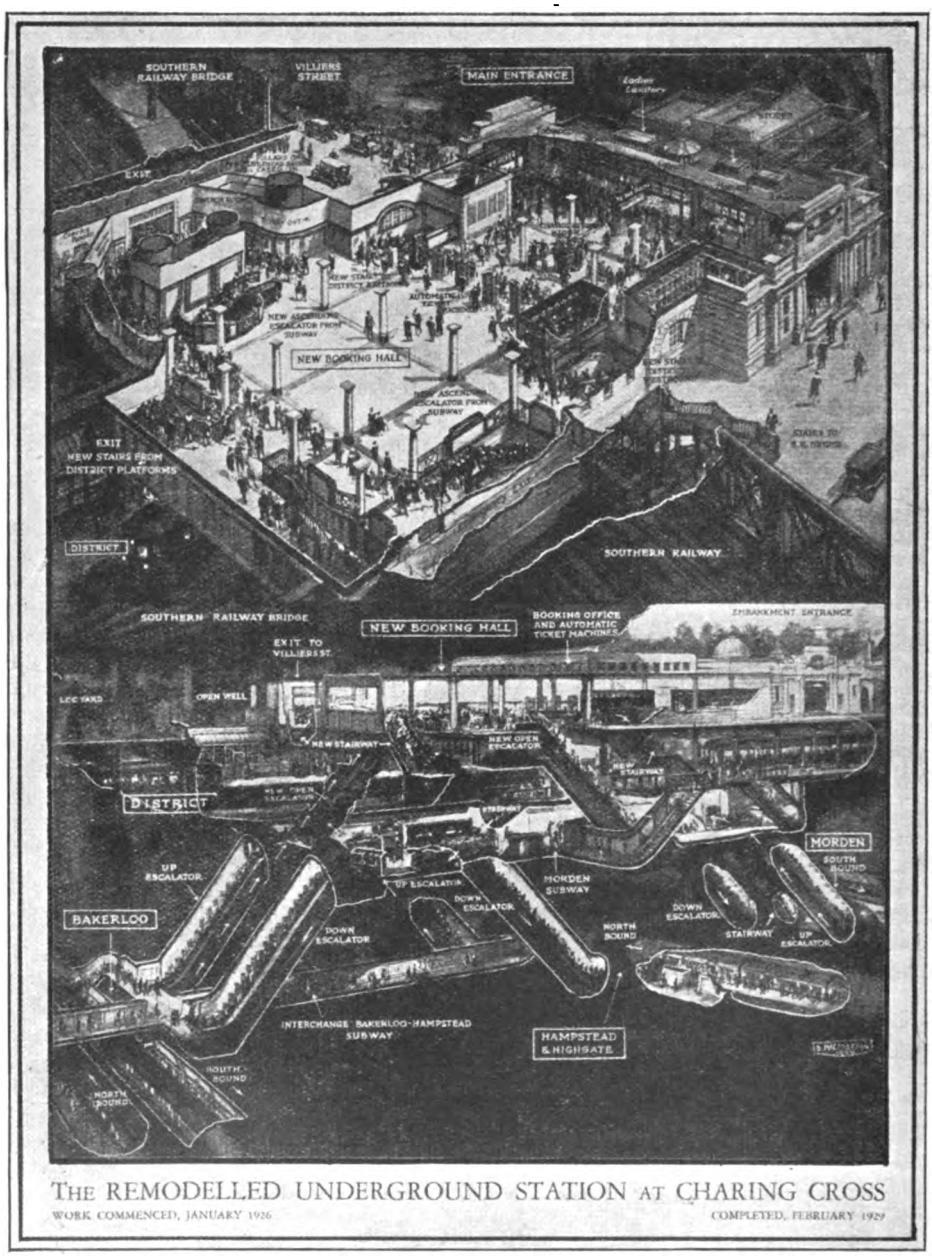


**SECTIONAL VIEW SHOWING PRINCIPAL FEATURES OF NEW STATION.**

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# The New Charing Cross Underground Station.

VIEW ACROSS NEW BOOKING HALL, WITH STAIRWAYS TO EAST AND WEST BOUND PLATFORMS

APART from a few minor details, the new "Underground" station at Charing Cross is now complete. The task of reconstruction has not been a simple one, for "Charing Cross," with its three separate railways, handles over 100,000 passengers a day. It was of importance, too, that the work should cause little or no inconvenience to traffic, and that the public should have the benefit of the improvements at the earliest possible moment. For this reason the various new features have been introduced piecemeal. Gradually through the months the new has superseded the old, and the result is virtually a new station capable of handling at least 50,000,000 passengers a year.

The need for reconstruction became apparent when the new Morden tube, linked up with the Hampstead line by a short connecting tube, threw an additional traffic of about 26,000 passengers a day through the station exchanges. The residents of Hendon and Edgware also made further claims upon the resources of the station, and with the prospect of still further increases in traffic, it was decided to add considerably to the facilities for rapid interchange and to entirely remodel the whole station.

Work began in 1926. The first step was the construction of a new circulating area beneath the District Railway tracks at a point where passengers could conveniently change between that railway and the Bakerloo and Hampstead tubes below. A new staircase connecting this intermediate hall with the west-bound District platform was constructed at the same time. Next came two new escalators which linked up the intermediate hall with the new south-bound platform of the Hampstead tube. Previously, there were four escalators. Now there are eight.

The next stage in the scheme was the installation of two more escalators which ran from the street level (Villiers Street) to the intermediate landing. These were opened for traffic on December 4 last, and were the first escalators to be installed at a District railway station. Their value in speeding the transit of the passengers from the street to the train cannot be over-emphasised. The journey which formerly took 60 seconds now takes only 30 seconds. There are no fixed stairways to negotiate.

Finally, came the new booking hall. The narrow arcade booking office connecting Villiers Street with the Embankment was cleared away, and a new hall, thrice as large as the old one, was built. This hall extends practically the whole length of the District platforms. It is 112 ft. long, 83 ft. wide, and has an area of 10,000 sq. ft. It is 13 ft. high, with a centre clerestory of 18 ft., and is supported on massive steel columns. These columns are encased with glazed terra-cotta tiles. The floor is paved with Durus tiles, similar



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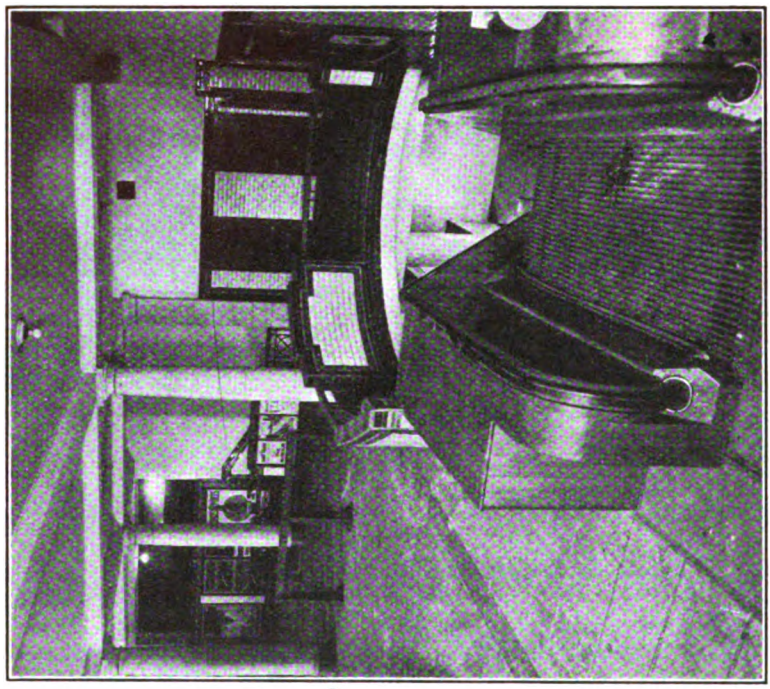
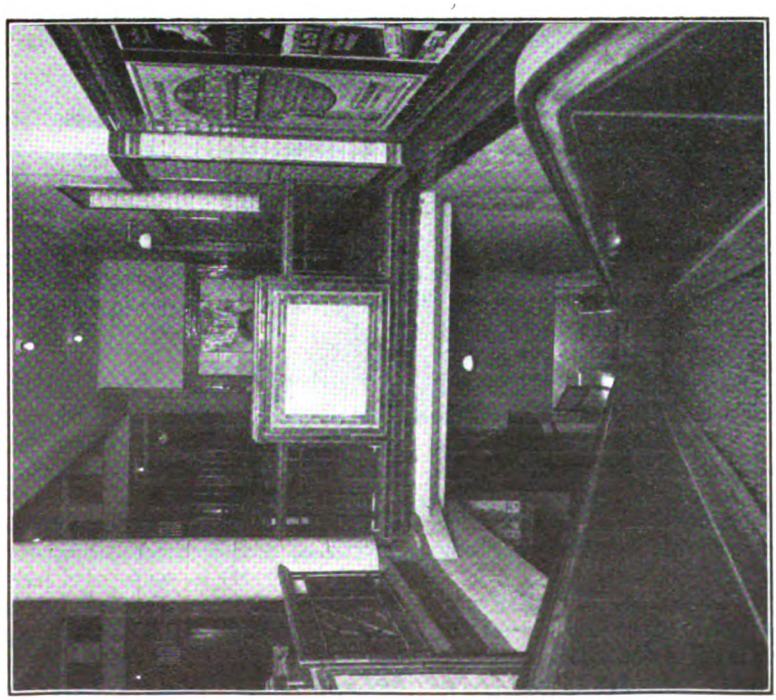


ESCALATOR FROM LOWER LANDING TO NEW BOOKING HALL, SHOWING PART OF CIRCULATING SPACE.



SECOND ESCALATOR FROM LOWER LANDING TO BOOKING HALL, PASSING DISTRICT RAILWAY EAST-BOUND PLATFORM ON LEFT.

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to those used at the new Piccadilly Circus station.

In the new hall there will be 20 automatic ticket machines of the self-printing type at which passengers will be able to book themselves. An ordinary booking office will issue long-distance tickets Change-giving kiosks, an inquiry office, and a special office for the issue of season tickets are additional new features. The station fronts to Villiers Street and the Embankment are floodlighted at night time. The booking hall is illuminated by means of a system of lamps situated outside the windows of the clerestory roof. Upon the site of the original booking office in the arcade, stalls are to be erected; also public lavatories.

WAYS TO STREET, THROUGH BOOKING HALL, AND TO DISTRICT RAILWAY WEST-BOUND PLATFORM, FROM TOP OF MORDEN LINE ESCALATOR.

It has been a problem for years to know how to direct comfortably the enormous number of people who daily use the station subways. A year ago subway guides were appointed. These men, dressed in distinctive uniforms, have done splendid service in directing strangers.

A further improvement is now being tried in the use of coloured route signs. Thus, a passenger arriving by the "Bakerloo" line and wanting Victoria will follow green lights placed about every 15-20 ft. along his line of route until he arrives at the west-bound platform of the District Railway, from which every train goes to Victoria. Similarly, a passenger arriving by the District Railway, and wanting Piccadilly Circus, will follow red lights to the Bakerloo north-bound platform, from which every train goes to Piccadilly Circus. Or, if wanting Waterloo or Morden, he will follow dark blue lights until he arrives at the Hampstead south-bound platform.

Obviously the number of distinctive colours that can be used is limited. Multiplicity of them would cause confusion and spoil the scheme. The three coloured routes, however, at Charing Cross provide for about 70 per cent. of the traffic using the subways, Victoria, Piccadilly Circus and Waterloo being amongst the busiest points on the "Underground" system. The scheme is in the nature of an experiment only, and it remains to be seen whether it will really relieve congestion and speed up movement in the subways.

Another experiment to be made at Charing Cross is that of employing small station names on the walls opposite the platforms, between the big advertisement spaces. When trains are full, it is difficult at times for passengers to see the regular station nameplates on the platform side, and it is thought that by having several small signs on the off-side the difficulty will be overcome.

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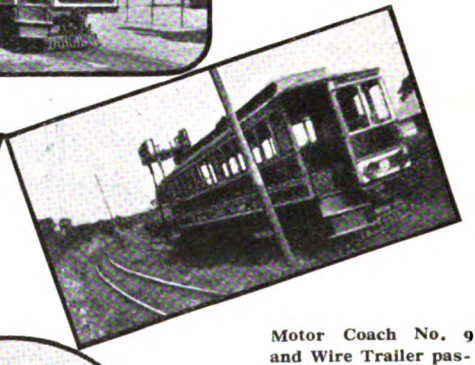
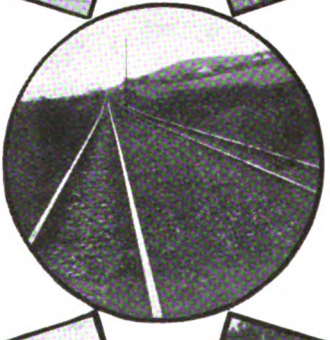
Train in Ramsey Station, the northern Terminus of the line. Motor Coach No. 20.

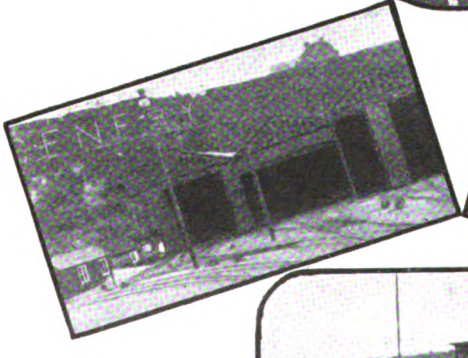
Three Coach Train outside Ramsey Station. Note Danger Flag denoting Railway Crossing in Left-hand corner.



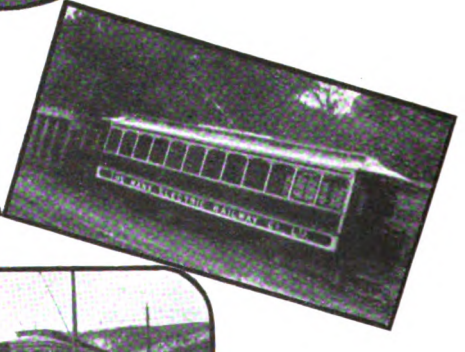
Motor Coach No. 9 and Wire Trailer passing Lewaigue Bungalow.



General View of the line between Lewaigue and Dreemskerry, the Steepest part of the line.



Scene at the Car Sheds at Douglas Terminus.



Old No. 2, 1893 in Siding at Ramsey. Note Open Platforms for Driver.

*Photos.*] Car No. 9 and Trailer (open) at Danglos Terminus (Derby Castle.) [*F. R. Dickinson.*

ELECTRIC RAILWAY SCENES IN THE ISLE OF MAN.

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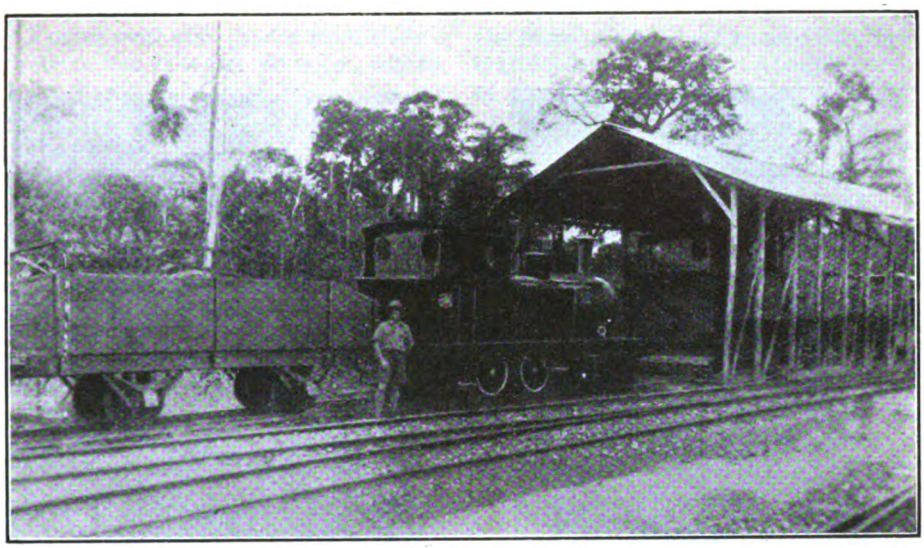

REBUILT LOCOMOTIVE "ODA," WITH TENDER, OUTSIDE SHOP AT APERADE.

# The Gold Coast Government Railways. [Central Provinces Line.]

By G. TAYLOR.

*(Continued from March number.)*

AFTER leaving Aperade the line rises to line summit 540 ft. above sea level. From mile 71 to 75 the line drops into the valley of the Kosiko River, which stream is crossed several times by culverts and a 20-ft. deck span at mile 74½; between miles 73½ and 74½, where a low-lying swamp is crossed considerable trouble has been encountered by flooding, and it was found necessary to heighten the banks by about 2 ft. over a length of half a mile.

Achiasi station is reached at mile 75¼, and consists of the usual two loops and passenger and goods stations with a siding opposite six "merchants' plots," as at Fosu. A concrete barrage and sump has been built across the Kosiko River to the north of the station to conserve water during the dry season, and a two months' supply is thus assured. Leaving Achiasi, the line traverses another swampy tract as far as mile 76, and here again it has been necessary to raise the banks by 2 or 3 ft.

The town of Oda is the district capital and is rapidly increasing in population and industrial activity as new and handsome public buildings allow for trade expansion. In addition to the usual passenger and goods stations, half a dozen extra sidings and loops are laid at the east end of the station area to provide for "merchants' plots," timber and rail dumps, and rolling-stock accommodation.

The Birrim River is reached at mile 83½ and is crossed by a combined rail and road bridge, consisting of two 100-ft. and one 60-ft. spans built on concrete piers. Great delay in the delivery of steelwork for this structure was caused in 1926 by the labour disputes in England, and it was found necessary to make the construction departmental instead of letting it out on contract as usual on such specialised work. The rapid rise and fall of the river caused much flooding.

Track laying is at present in progress up to Wenchi station at mile 86, while the



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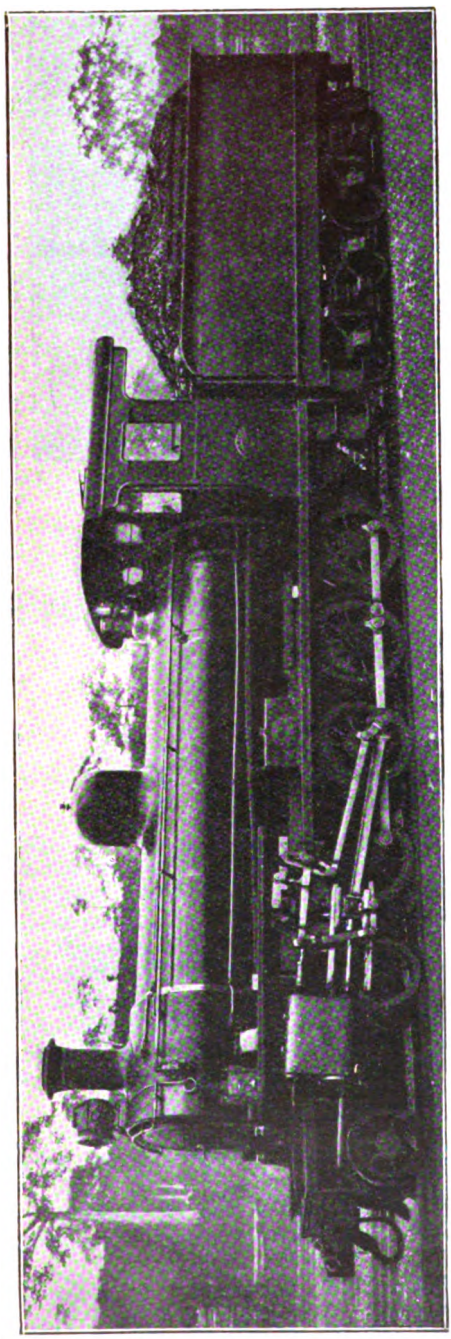
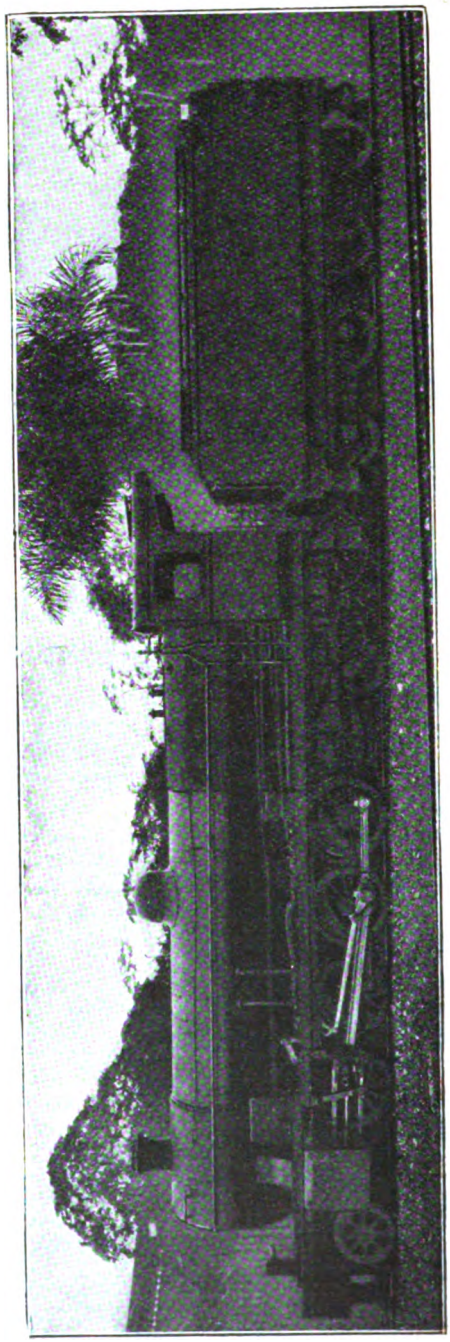


4-8-0 LOCOMOTIVE, GOLD COAST GOVERNMENT RAILWAYS



4-6-2 LOCOMOTIVE, GOLD COAST GOVERNMENT RAILWAYS.

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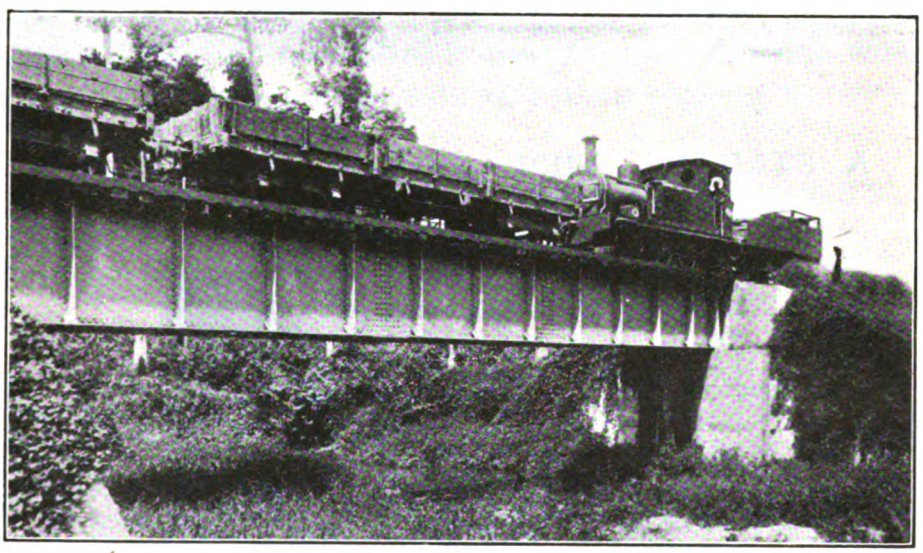
last 12 miles over easy grades from thence to the terminus at Kade, 98 miles, will be open for traffic early in 1928.

Kade station area comprises special terminal passenger and goods stations, while coaching-stock sheds and extensive marshalling sidings allow for future trade development. A reversing triangle is provided, and a permanent running shed, fitting and machine shops will allow locomotive repairs to be done on the spot. The line has been surveyed through to a junction with the Kumasi–Accra main line, but no construction is anticipated for some years.

Four small six-coupled tank engines work the bulk of the construction traffic, assisted the fireman's use by two auxiliary firemen stationed on the tender. About 300 cub. ft. of wood was usually carried and handled in this way.

A further difficulty was the extremely small water capacity of the side tanks—300 gallons only—and this was got over by fitting iron water-tanks in the tenders with a capacity varying from 500 to 800 gallons, feed being into the locomotive side tanks either through auxiliary injectors or in one case by gravity. These locomotives when thus fitted are capable of trips of 50 miles with 80 to 100-ton loads without replenishing fuel or water supplies. and, in spite of their coal-burning fireboxes, proved excellent steamers with



TANK ENGINE "ODA" WITH TEMPORARY TENDER ON 60 FT. BRIDGE AT MILE 67.

by one or two 2-8-0 tender engines lent from the main-line stock. The tank engines weigh 20 tons in running trim, heating surface about 600 sq. ft., working pressure 170 lb., wheels 3 ft. diam., cylinders 11½ by 16 in. As originally constructed, these engines were intended for coal burning, and the bunker, when full, would carry 1 ton. Owing to the long runs required, the expense of coal and the difficulty of obtaining it, the locomotives were fitted with locally-built temporary wooden tenders, as shown in one of the illustrations. The flooring of these tenders was carried forward over the central buffer between engine and tender in order that firewood may be placed in the bunker for wood. The average speed of ballast and stores trains is about 15 to 20 m.p.h., but on pay trains and special occasions the writer has driven and timed them at 40 m.p.h., at which speed they prove remarkably steady.

The 2-8-0 tender engines were old stock from the main line and date back to 1904. Coupled wheels about 3 ft. 3 in., cylinders about 16 by 20 in., and working pressure 150 lb. These locomotives handle 180-ton trains with ease in spite of burning firewood in their coal-burning fireboxes. The locomotives are painted black, varnished, with white wheel rims and red lining. After three years' work with little attention, it was found necessary to put the tank

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engines under heavy repairs, and with one exception this was carried out at Aperade shops. Vacuum brakes were then fitted and carried through to the rear of the tenders. Large acetylene head and rear lights are mounted on the smoke-box and cab roof respectively and fed by a generator on the foot-plate.

The rolling-stock consists of about thirty long, low-sided timber bogey wagons of 12 tons capacity and half a dozen steel-framed, high-sided bogey wagons of about 20 tons.

Cement is carried in bogey all-steel vans and is run straight through in main-line vehicles, which have, of course, to be returned into traffic at once. Ballast trains usually consist of sets of four bogey wagons except in the case of the large locomotives, when six or eight are taken.

Electric staff working was not employed until regular passenger-train traffic was instituted up to Oda. During construction, telephonic permission to run a train in a section was granted from either end. During rush periods, however, permissive time-internal working was allowed, and in spite of very close running, remarkably few minor accidents occurred.

Native drivers and firemen are employed in all cases, usually men who have had extensive experience previously, but the writer succeeded in training a small class of fitter-drivers who are able to execute running repairs and drive in a more scientific manner than usual, no previous attempt at either linking-up or firing and injection to suit the grades and loads having been made.

## A STRIKING VIEW OF S.R. 4-6-0 No. E850 "LORD NELSON."

*Photo.*] [*E. Brown.*

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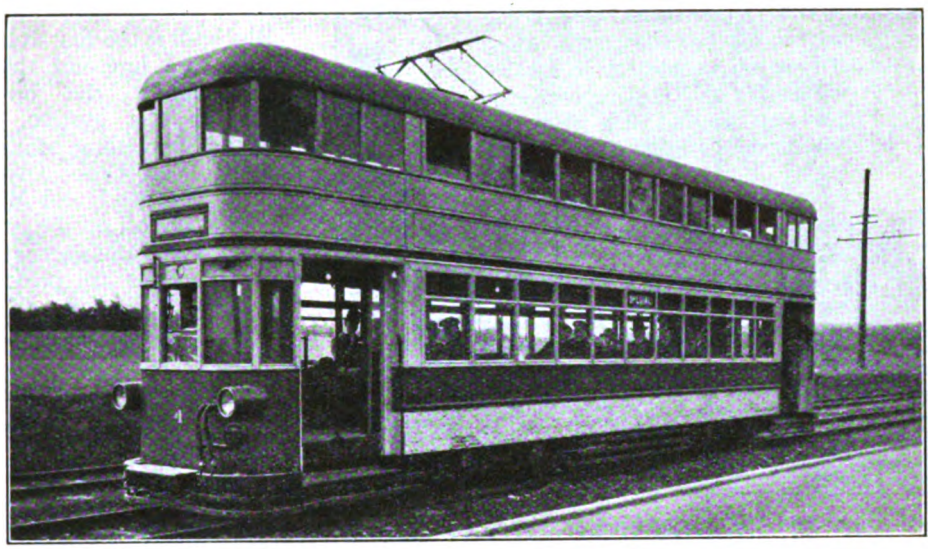

ONE OF THE NEW B.T.H. ELECTRIC CARS.

# The Swansea & Mumbles Railway.—[No. II.]

By CHARLES E. LEE.

THE railway as at present worked for passenger traffic starts in Swansea, near the L.M.S.R. Victoria Station, at the junction of Rutland Street and Victoria Road, at which point are also situate the offices of the company, the old locomotive shed, and the new electric car depôt. Before, however, proceeding to follow the main line it is advisable to consider briefly the non-passenger lines hereabouts. It will be noticed that the original Act quoted above stated that the railway was to start from the Swansea Canal at a place called the Brewery Bank. The line between here and Rutland Street, is still in existence, running largely at the back of the houses, but is disused and derelict excepting for a short section along Victoria Road which effects a physical connection with adjacent systems. This was leased to the Swansea Harbour Trust, which was acquired by the Great Western Railway.

An old railway publication of 1836 mentions that this branch was carried northwards on the west side of the canal to Morriston. The present writer has been unable to trace any powers being granted for such an extension although contemporary maps support its existence. Such powers would not, of course, have been essential as the property here was owned by the canal undertaking who probably made a friendly arrangement to avoid transhipment for short hauls. In any event, all traces have long since disappeared.

In addition, the Act of 1804 mentions a short branch from the Mount to Swansea Pier. This, together with other short lines to quays, &c., were lost apparently during the first 40—50 years of the undertaking.

Returning to Rutland Street, the main line proceeds along the left-hand (south-east) side of the Oystermouth Road. The first station is at St. Helens, locally known as The Slip. Here are met the local tramways from the centre of the town. There was formerly a physical connection between the two at this place, dating from the days when the trams exercise running powers over the railway, but the points



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[*Photopress.*

**STEAM TRAIN TRAVELLING ALONG ROADSIDE.**

have now been taken out. Shortly afterwards is passed the site of the disused St. Gabriel station (closed in 1912) and about three-eights of a mile further is Brynmill station. Between here and the next existing station at Blackpill various changes have taken place. There was formerly a station at Sketty Road which was closed many years ago. Here the Clyne Valley mineral branch leaves the main line on the west side and follows the Clyne Valley. The branch is still existing, but is not at present used, as minerals are not now being worked in the district served. At this point, also, the L.M.S.R. (formerly L.N.W.R.) line, which has so far been running parallel with the Swansea & Mumbles line, but between it and the seashore crosses over on a bridge and branches off to the west, following along the same route as the Clyne Valley mineral branch, on its way to Killay and thence to Gowerton. The two systems are connected by a short line on the north side of the bridge. Just beyond the bridge is the site of Mumbles Road station, now disused; here the route of the new line of 1898 commences. So far the track is single with passing places, but onward to Mumbles it is practically double, although only one line is used for traffic and the other reserved for sidings, &c. As far as Norton Road the line nearer the sea, and thence to the terminus the landward line, provide the running road respectively.

Blackpill is the first station on the new line and this is approximately the middle point of the system. It and the succeeding stations, namely, West Cross, Oystermouth, Southend, and Mumbles Pier, are all off the public road. Wood and corrugated iron structures are provided for use as station offices, waiting rooms, &c. There is a disused station on this section at Lilliput (closed in 1900), on the old route between Blackpill and West Cross, while Norton Road, between West Cross and Oystermouth, which was closed for some years, is now being re-opened. The total length of the system as at present worked is 5 miles 60 chains of single track, with 65 chains of second track and 2 miles 69 chains of sidings.

The terminus at Mumbles is adjacent to the land end of the fine 800-ft. pier opened in 1898, and alongside the refreshment rooms.

No ordinary signalling arrangements were used during steam operation, the driver of an up train handing the key of the points to the driver of a down train as they passed. There are coal sidings at Oystermouth and wagon repair works at Swansea.

### Old Locomotives and Rolling-Stock.

On the introduction of standard-type locomotives two saddle-tank engines, numbered 1 and 2 were obtained from R. & W. Hawthorn, Leslie & Co. Ltd., Newcastle-on-Tyne. These were of the 0-4-0 type with outside cylinders 12 in. in diameter and having an 18-in. stroke. The buffers were exceptionally large, being about 20 in. in diameter. No. 3 was built in 1907 by the Brush Electrical Engineering Co. Ltd., Loughborough. This was also an 0-4-0 saddle-tank engine, the cylinders, however, being 14 in. in diameter with an 18-in. stroke. Nos. 4 and 5 are 0-6-0 side tanks built in 1899 by the Hunslet Engine Co. Ltd., and have 13-in. cylinders and an 18-in. stroke. Prior to electrification the locomotive stock consisted of four, namely, Nos. 3, 4 and 5 (the two earliest ones

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having been scrapped) together with an 0-6-0 type Avonside saddle-tank named *Swansea*. She was obtained a few years ago from a local firm. The engines carried a bell, after the American practice, and for the same reason, namely, that the line is largely alongside a public road. Two locomotives are being retained to handle the goods traffic.

The rolling-stock consisted of 39 passenger carriages and one goods vehicle. The passenger stock was of the double-deck tramway type divided into two classes. First-class carriages were eight-wheeled bogie cars, the seats inside running lengthwise, and those on the roof being of the garden-seat type. Second-class carriages were four-wheeled, with inside seats arranged similarly with the first class, and outside seats running back-to-back longitudinally. There were no continuous brakes on the cars but most vehicles were fitted with hand brakes. As all the station platforms were on the west side of the line, the exits were on the same side back and front instead of being "staggered," as is normal with tramway-type stock. Further, the carriages were only lettered on the side facing the road. Some of the old four-wheeled cars, without outside seats, were reserved for workmen, while certain of the bogie cars were 1st and 2nd class composite. The vehicles were equipped with side buffers, and were coupled by ordinary screw couplings and side chains.

## Traffic.

Although originally promoted as a mineral line carrying a few passengers as a "side issue," the whole character of the line has gradually changed, the turning point being apparently about 1870. At present the traffic is almost entirely passenger, and this is unusually heavy, as many as 40,000 persons having been carried on a Bank Holiday. On occasions 18 or 20 loaded cars have been included in one train, conveying as many as 1,800 passengers (and without double heading). Incidentally, this is a total but infrequently conveyed by one train on any other British railway. Of course the gradients are very easy—the line is practically level with the exception of a down grade from Blackpill to West Cross—and the speed never exceeded 20 m.p.h., the average being about 7 or 8 m.p.h. Thirty minutes were

**STEAM ENGINE SHED AT STREET CROSSING.** [*Photopress.*

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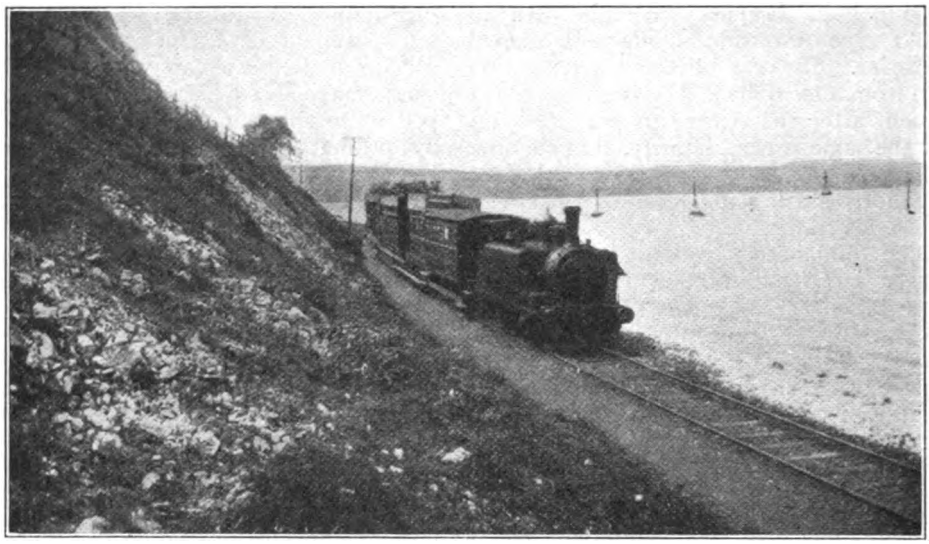

*Photo.*] STEAM TRAIN ROUNDING SWANSEA BAY, NEAR MUMBLES. [*G. W. Tripp.*

allowed for the single journey of about 5½ miles. Eighteen trains on week-days and 12 on Sundays were provided in each direction, at irregular intervals of roughly one hour. Taking 1925 (the year before the general strike) as typical we find that 682,108 passengers were carried, made up of 140,814 first-class, 278,528 second-class, 14,804 second-class excursion, and 247,962 workmen. The goods conveyed during the same period amounted only to 8,994 tons, and consisted of 8,462 tons of coal, 63 of lime and limestone, and 469 of merchandise.

### Electrical Equipment.

The electrification, which had long been discussed, and is now completed, was carried out according to plans prepared by the company's engineering staff, and under their direct supervision. A system of operation by D.C., carried by overhead trolley at 650 volts, has been adopted. Electricity for the line is supplied from the generating station of the Swansea Corporation, whose electrical engineer is Mr. J. W. Burr. This supply is in the form of A.C. at 6,600 volts, and in order to convert it into D.C. at 650 volts a sub-station has been provided by the Swansea Corporation Electricity Department at Blackpill, which is about the mid-point of the line.

The sub-station equipment was supplied by the Metropolitan-Vickers Electrical Co. Ltd. It covers two 500-kW. rotary converter sets with fully automatic control gear. Provision is made for the later installation of a third rotary converter set when required. The equipment includes the complete automatic protective gear which is a feature of Metrovick automatic control gear. Arrangement of the equipment is such that initial impulse of starting the station when required is given by operating a switch on the supply circuit at the generating station. The first rotary converter at the sub-station then starts automatically and connects its output to the line. The second machine comes into commission whenever the load on the line requires the operation of both machines. Directly the load falls to a value at which it can be carried by one machine alone, the machine last started is automatically disconnected and stopped.

### Electric Rolling-stock.

Eleven new cars have been built for the newly-electrified line by the Brush Electrical Engineering Co. Ltd., Loughborough. They are each capable of seating 106 passengers, 48 in the lower saloon, and 58 on the top deck, and are the largest electrically-driven tramcars built for service in this country. In general appearance the cars are of the

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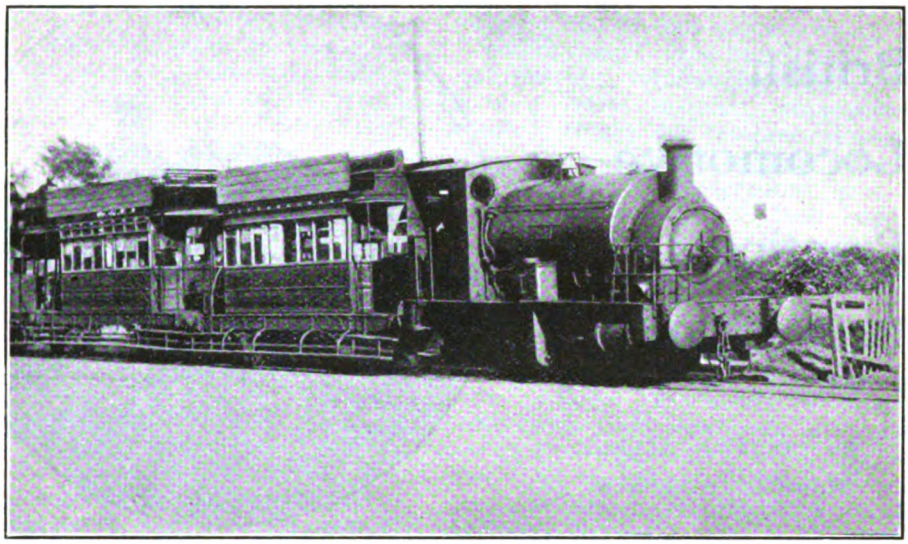
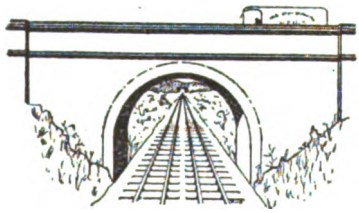


*Photo.*] SWANSEA & MUMBLES TRAIN. LOCOMOTIVE No, 3. [*T. R. Perkins.*

double-bogie, two-deck covered-top type, with platform and staircase at each end. As was the case with the old steam rolling-stock, both entrances are on the same side.

Each coach is fitted with British Thomson-Houston two-motor electrical driving equipments and B.T.-H. air-braking equipment. The control equipment is of the electro-magnetically operated contactor type, only small control currents being dealt with by the master controller, the heavy motor currents being broken in individual contactors. A train ordinarily consists of one or two 30-ton coaches, as required, and in either case control may be effected from either end of the train, two motors being in operation on a single-coach train, and four on a two-coach train. Safety devices include the incorporation in the driver's cab of the dead man's handle, release of which not only cuts off the supply of power, but also automatically causes the full application of the air brakes. The compressed air for the brakes is supplied by automatically-controlled electrically-driven air compressors. Both the motive power equipment and the air brake system have been supplied by the British Thomson-Houston Co. Ltd., Rugby.

The seating accommodation on both decks is arranged transversely, with the exception of a small number longitudinally at each end. The seats are spring upholstered, covered in blue antique leather, and were made to special requirements by G. D. Peters & Co. Ltd.



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# British Locomotive Practice and Performance.

By CECIL J. ALLEN, M.Inst.T., A.I.Loco.E.

BARNSTAPLE-TORQUAY EXCURSION TRAIN.
G.W.R. 2-6-2T No. 5502.

ONE of the most important railway documents which has appeared for some time past is the recently-published report of the Bridge Stress Committee. It is an encouraging sign of the times that, in place of the almost traditional "water-tight compartment" method of railway departmental working, the two great technical departments—the civil engineering and the mechanical engineering—have here combined in exhaustive research work with a view to discovering both the best type of bridge construction for all but special locations, and also what modifications in locomotive design are necessary in order that the stresses on bridgework and on track set up by passage of the locomotives at speed over both may be reduced to a minimum. The tests consisted, in general, of assembling a number of engines of different types, both passenger and freight, and then of running them light over various representative bridges, where very sensitive recording apparatus was employed in order to secure an exact record of the stresses thus set up. Incidentally, the engines were on a number of occasions run light at the highest speeds of which they were capable, and some perfectly astonishing speed records were made, in certain cases, too, by the most unlikely engines, a speed well in excess of 80 m.p.h., for example, being attained on the level by a six-coupled engine with driving wheels of only 5-ft. 8-in. diameter.

So far as concerns locomotive design the tests had the effect of concentrating attention on balancing. The "hammer-blow" produced on the track, at each revolution of the driving wheels, by certain two-cylinder express types, when running at speed, was found to be far worse, in its dynamic effect, than any effect of the concentration of engine weight on the driving axles concerned. The proof was so convincing that it has had immediate influence on subsequent British locomotive design; this influence is seen in the outbreak of new three-cylinder locomotive types, which appears to be the leading feature of present-day British locomotive policy.

Sir Vincent Raven, Chief Mechanical Engineer of the late North Eastern Railway had been the prime-mover (apart from one or two earlier isolated experiments) in three-cylinder simple locomotive construction, long before any Bridge Stress Committee was thought of, having built extensively 4-4-2, 4-6-0 and 0-8-0 tender, and 4-4-4, 4-6-2 and 4-8-0 tank types thus propelled. Then followed Mr. H. N. Gresley, on the Great Northern, first with the "1000" batch of "Moguls," and later, with the experience so gained, with the "Pacifics" of 1922, both of which types have now been greatly



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multiplied. Since the findings of the Bridge Stress Committee began to take shape, two other railway groups have followed suit. The London Midland & Scottish Railway has built the 4-6-0 "Royal Scots" with three cylinders; and the Southern Railway is understood to be about to construct some large three-cylinder 4-4-0 engines, but little inferior in power to the 4-6-0 "King Arthurs," and also some three-cylinder "Moguls" additional to the two already running. On the London & North Eastern Railway, Mr. Gresley has added to the previous three-cylinder types the 4-4-0 "Shires," and the 4-6-0 "Sandringham" class, and is now to produce some three-cylinder 2-6-2 tank engines for fast outer suburban services, more particularly in Scotland.

As compared with the two-cylinder engine of corresponding size, the three-cylinder simple has the disadvantage of an extra cylinder and additional motion to instal and maintain, but there is, on the other hand, the substantial advantage of being able to employ smaller and lighter motion parts. The location of three cranks dividing the circle up into three equal parts of 120 degrees each, as compared with two cranks at 90 degrees, again means that to a large extent the engine is already balanced, and this fact, coupled with the reduced mass and weight of the motion parts, is responsible for reducing "hammer-blow" to a minimum. Exactly the same advantages are obtained with four-cylinder propulsion, the objection of yet another cylinder being offset by the need for two sets of motion only, as compared with three sets, or the complex Gresley derived motion, in a three-cylinder engine.

As a result of this better balancing, it has been found practicable to increase coupled axle-loads. In place of the one-time maximum of 20 tons per axle in this country, in multi-cylinder engines, a maximum of 23½ tons is now permissible, although actually no engine with over 22½ tons per axle has yet been built. The advance rendered possible by three-cylinder propulsion is well illustrated by the new "Sandringham" class on the London & North Eastern Railway. Previously, the Great Eastern section could not carry anything heavier than the Holden 4-6-0 engines, with their 44 tons adhesion and 64 tons engine weight. The "Sandringham" type has 54 tons adhesion out of a total engine weight of 76 tons—a very material improvement, which is chiefly due to three-cylinder in place of two-cylinder propulsion. Doubtless, the same considerations have influenced the Southern in their building of three-cylinder 4-4-0 engines for the difficult conditions of the Hastings and Margate routes.

Concurrently with this development in the design of locomotives of what may be termed "ordinary" types, there are some striking experiments in progress with a view to increasing the abnormally low thermal efficiency figure of the locomotive of traditional design. Increased length of valve-travel and higher working pressures, from, say, 200 to 250 lb. per sq. in., valuable though they are in making possible much more economical running, touch but the fringe of the problem. It is becoming abundantly clear that one avenue of approach to the solution lies in far higher pressures than any hitherto attempted in locomotive practice. Reference has been made in these articles previously to the promising experiments in Switzerland and Germany in this direction; the Swiss engine works at 850 lb. per sq. in., and the Henschel 4-6-0 engine in Germany has a commencing pressure of 900 lb. per sq. in., generated in a drum of special design above the boiler, at which pressure the steam is used in the middle or high-pressure cylinder, whence it is led to a receiver, there reinforced with steam produced in a boiler of more normal design, and so to the low-pressure cylinders at 250 lb. per sq. in.

It is highly interesting to note that the London Midland & Scottish Railway Company is having built by the North British Locomotive Company a 4-6-0 locomotive of this type, to work as a three-cylinder compound at these pressures, but conforming otherwise in general proportions with the "Royal Scots," against which it is to be tested. The London & North Eastern Railway, so the newspapers report, has similarly had under construction for some time past a "mystery" 4-6-2 express engine which is, so far as can be gathered, of much the same description. In France, the P.L.M. Railway is to go yet further, having ordered from the

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**1. L.M.S. BIRMINGHAM-PETERBORO' TRAIN APPROACHING PETERBORO'.**
*Photo.]* Mid. 2-4-0 No. 215. *[H. L. Salmon.*

**2. DOWN "MERSEYSIDE" EXPRESS, L.M.S.R.**
*Photo.]* 3-cylinder 4-6-0 No. 6144 *Ostrich.* *[F. R. Hebron.*

**3. 10.45 A.M. EUSTON-NORTH WALES EXPRESS PICKING UP WATER AT BUSHEY.**
*Photo.]* L.N.W. Locomotives, 866 *Courrier* and 2427 *Sir Francis Dent.* *[F. R. Hebron.*

**4. DOWN L.M.S.R. EXPRESS NEAR KENTON.**
*Photo.]* 4-4-0 No. 1152. *[F. E. Mackay.*

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Henschel Company in Germany an express locomotive to work at a commencing pressure of 1,000 lb. per sq. in. Even this, however, will not rival what was told us by the *Daily Mail* about the late "Decapod" of the Great Eastern Railway, which, we were gravely informed, was to work at the truly colossal figure of 200 *tons* to the square inch!

Refreshing tendencies towards novelty in locomotive design are thus at last apparent on every hand. The Beyer-Peacock turbo-condensing engine and the Kitson-Still combined steam and internal-combustion design have both been tried, but have not, presumably, proved as successful from the economic standpoint as had been hoped, though the second of these designs has not, perhaps, had a sufficiently extended trial for definite opinions to be formed. Then there is, in another direction altogether, the Diesel-electric method of propulsion, so successfully developed in the Beardmore designs now at work on the Canadian National Railways and also in the motor-train which has been at work between Lytham and Blackpool on our L.M.S. system. It is understood that the London & North Eastern Railway is now to convert one of the 0-4-4-0 electric locomotives of the freight type in use between Shildon and Middlesbrough to a self-contained Diesel-electric locomotive, which will throw further light on the relative economy of this method of propulsion. It seems clear, therefore, that no stone is being left unturned in Great Britain to increase the efficiency of railway operation from the haulage standpoint, and even though, by comparison with other countries, this development of energy may appear to have been somewhat tardy, there is no doubt as to the thorough-going nature of the experiments now in progress. We may congratulate ourselves, too, with the reflection that the steam locomotive still appears to have before it a lengthy lease of life, although present developments may lead to some radical changes in the external lines to which we have now become so accustomed.

I may as well seize the opportunity at this stage of detailing my first observations of the work of the new "Sandringham" 4-6-0 engines on the L.N.E.R., to which reference has just been made. Strangely enough, my first sight of one of these handsome machines was in the Central Station at Manchester, as one of the first jobs to which they were detailed was the working between Ipswich and Manchester of the "North Country Continental" of the L.N.E.R. I have had two trips from Manchester to Sheffield on what is, from the grading point of view, considerably the hardest stretch of the journey, but the standard winter load—of five 8-wheelers and two 12-wheelers

L.N.E.R. MANCHESTER-SHEFFIELD.

| Distance. | Engine, 3-cyl. 4-6-0 No.<br>Engine Name<br>Load (tons tare)<br>" ( " full) | Schedule. | 2802<br>*Walsingham.*<br>225<br>240 | 2807<br>*Blickling.*<br>218<br>230 |
|---|---|---|---|---|
| miles. | | min. | m. s. | m. s. |
| 0·0 | Manchester (Central) .. | 0 | 0 00<br>sigs. | 0 00 |
| 1·5 | Throstle Nest E. Jc.* .. | — | 4 20 | 3 55 |
| 3·1 | Chorlton .. | — | 7 05 | 6 35<br>p.w.s. |
| 4·2 | Wilbraham Rd. | — | 8 55 | 8 40<br>p.w.s. |
| 6·9 | Levenshulme .. | — | 12 20 | 13 10 |
| 9·8 | Fairfield .. | — | 16 30 | 18 00 |
| 11·1 | Guide Bridge .. | 17 | 18 45<br>sigs. | 20 10 |
| 14·4 | Godley Jc. .. | — | 24 20 | 24 55 |
| 18·0 | Dinting .. | — | 29 30 | 29 45 |
| 21·4 | Torside Crossing | — | 35 00 | 35 00 |
| 23·3 | Crowden .. | — | 38 00 | 38 10 |
| 25·3 | Woodhead .. | 39 | 41 25 | 41 30 |
| 28·5 | Dunford .. | 44 | 46 30 | 47 20 |
| 34·5 | Penistone* .. | 51 | 53 15<br>p.w.s. | 54 05 |
| 38·6 | Wortley .. | — | 58 55 | 58 40 |
| 42·5 | Oughty Bridge | — | 64 00<br>sigs. | 62 50<br>sigs. |
| 47·4 | Sheffield .. | 66 | 71 10 | 70 00 |
| 47·4 | Net times (min.) | 66 | 66½ | 67 |

* Service slack.

weighing in all 240 tons—could hardly be described as heavy, and the work was disappointing. There is an ample margin of time at Sheffield, and a very easy booking with a train of but five coaches from there to Lincoln, and with these in view, drivers appear little inclined to hurry on this first stage of the journey.

It so happens that the gradients are reproduced elsewhere in the present

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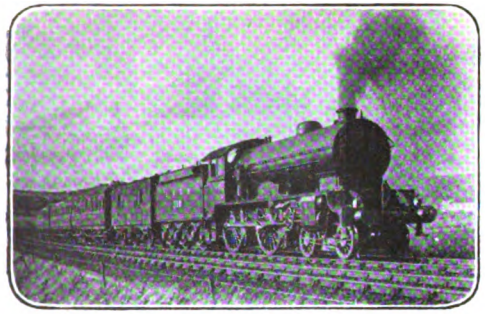
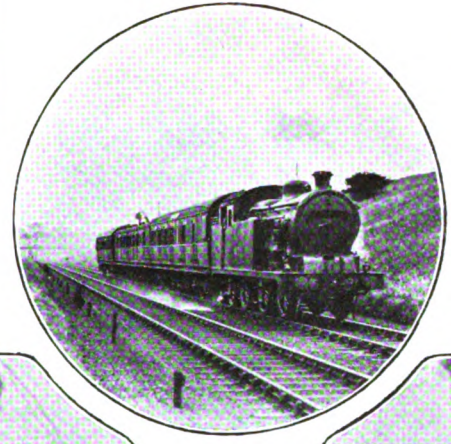


**ABERDEEN-EDINBURGH EXPRESS AT INVERKEITHING.**
4-4-0 No. 310 *Kinross-shire.*
*Photo. R. D. Stephen.*

**G.N. SECTION WELWYN CITY EXPRESS NEAR POTTERS BAR.**
0-6-2T No. 471.
*Photo. H. Gordon Tidey.*



**EDINBURGH-ABERDEEN EXPRESS NEAR SAUGHTON.**
4-4-2 No. 9875 *Midlothian.*
*Photo. C. J. L. Romanes.*

**UP LONDON EXPRESS NEAR RUGBY.**
G.C. 4-4-2 No. 6091.
*Photo. W. Leslie Good.*

**DOWN HARROGATE EXPRESS NEAR POTTERS BAR.**
4-6-2 No. 2559 *The Tetrarch.*
*Photo. F. R. Hebron.*

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issue; the times of the two runs I have tabulated, and only the speeds require mention. *Blickling* had signals on before Throstle Nest Junction, and so made a very slow start; speed rose to 49 m.p.h. at Fallowfield, but fell to 40½ at Hyde Road, and with a slight signal check at Guide Bridge we were 1¾ min. late there. But instead of picking up on the ascent to Woodhead, we lost 40 sec. more. Speed rose to 47 m.p.h. at Dinting, fell to 35 on the 1 in 100 but recovered to 37½ on the 1 in 117, and very slightly further on the 1 in 200 through the tunnel to 38 at Dunford. After Dunford, there was the usual restrained downhill travelling, with no higher rate than 67 m.p.h., a bad slowing through Penistone, a crawl over p.w. relaying at Wortley, and signals outside Sheffield, making us just over 5 min. late. Net time was, by my calculations, ¾-min. over the 66 min. allowed.

The run of *Walsingham* was no better. Permanent-way slowings at Chorlton Junction and Wilbraham Road delayed us at the start, and we did not get above 37 m.p.h. at Levenshulme, falling then to 34 at Hyde Road—a poor exhibition—but recovering to 40 at Fairfield and 45 at Guide Bridge, which we passed over 3 min. late. From there up to Woodhead we gained 40 sec., with speeds of 40 m.p.h. at Hyde Junction, 43 at Godley, 49 at Mottram and Dinting, 37½ at Torside, and 38 at Woodhead; but the drop to 28 in the tunnel, on 1 in 200 with 240 tons, was an indifferent piece of work, and involved us in nearly a minute loss between Woodhead and Dunford. In descending to Sheffield we did not better 65 m.p.h., and with several subsequent slowings, stopped in Victoria Station 70 min. after leaving Manchester—a loss of 4 min. Net time was 67 min., so that again a minute must go against the engine. I shall look forward, however, to trying one of these engines on the Great Eastern section proper, where it is understood that they are doing some excellent work.

Before leaving this stretch of line, however, I should like to mention an excellent run in the opposite direction which I enjoyed recently behind an engine of a type whose doings in this locality have not previously come under record. Great Northern "Atlantic" No. 4412, on the 4.45 p.m. from Sheffield to Liverpool, had to handle a train of six 8-wheelers and four 4-wheelers, weighing, full, some 220 tons. By Oughty Bridge we had got up to 40 m.p.h., and again at Wortley we were travelling at 40; through Penistone the rate was 43½ an hour, falling to a sustained 41 until we were almost to Dunford, when, by premature notching up, the driver caused a drop to 37½ m.p.h. The ascending times were quite good—7 min. to Wortley Bridge, 10 min. exactly to Oughty Bridge, 16¼ min. to Wortley, 22 min. 25 sec. to Penistone, and 31¼ min. (booked 32 min.) to Dunford. The tunnel was taken gently, Woodhead being passed in 35½ min., but afterwards we maintained a steady 66-67 m.p.h. until slacking for Dinting, which we passed in 42 min. 35 sec. At Mottram we suffered a signal stop, exactly 46 min. after leaving Sheffield, and so took 50 min. 55 sec. to Godley Junction, but the net time was not more than 47½ min., instead of 50 min. booked. The remainder of the journey, with 60 tons less, was of minor interest; the 13·2 miles from Stockport to Glazebrook took 17 min. 20 sec., start-to-stop, speed rising to 60 an hour at Baguley and Partington.

With the 4-4-0 "Shires" I have not, personally, struck anything out of the ordinary yet. Coming down from Darlington to York with a modest load of seven 8-wheelers, weighing 210 tons, No. 251, *Derbyshire*, made an undistinguished trip, passing Eryholme in 8 min. 20 sec., Northallerton in 17 min. 20 sec., Thirsk in 24 min. 40 sec., Alne in 34 min. 55 sec., and Beningbrough, 38·6 miles, in 40¼ min. Speed did not exceed 66 m.p.h., at Thirsk and Alne. We should have stopped in York in 47 min. for the 44·1 miles, but for signal checks outside, which made the total time 49 min. 25 sec. On the 5.30 p.m. out of King's Cross, however, No. 245, *Lincolnshire*, had to tackle a 375-ton train on a night when the customary "Pacific" had developed some minor defect, and with all allowance for misty, and in places, foggy conditions, did not do too well. We were through Finsbury Park in 7 min. 25 sec., but took 23¼ min. to clear Potter's Bar, 28 min. 55 sec. to Hatfield (passed at 67 m.p.h.), 37 min. 10 sec. to Knebworth, 44¼ min. to Hitchin, and 47½ min. to Three Counties, where we were doing 70½ m.p.h., but after this came a bad

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signal check at Arlesey. Subsequent times were 59 min. 10 sec. to Sandy, 75 min. 10 sec. to Huntingdon, 95 min. 25 sec. to Peterborough, 129½ min. to Stoke and 136½ min. to Grantham—a loss of 22½ min., most of which must go against the engine. The "Shires" can, however, do very far better than this, as witness a run made by Sparshott with this very engine on the 8 p.m. from Peterborough (the 5.30 p.m. from Leeds) to King's Cross, when with 420 tons he completed the distance of 76·4 miles in 82 min., 3 min. inside schedule. They have also been responsible for some excellent feats in the North Eastern Area, so that one can only suppose the engine to have been out of condition or the driving to have been at fault on the occasion just mentioned.

Another disappointing experience befell me recently behind yet a third locomotive type concerning the doings of which readers have expressed a desire for information—the rebuilt "Claughtons" on the Western Division of the L.M.S. I travelled by the 11.50 a.m. Manchester and Liverpool express out of Euston when No. 5999, *Vindictive*, had to haul the not immoderate load of 13 bogies, one of them a 12-wheeler, weighing 381 tons empty and 400 tons full. We had but one out-of-course check—p.w. repairs at Colwich—but succeeded in losing 2 min. 20 sec. on the 175 min. allowance to Crewe; net time was slightly over rather than slightly under booked time. We made a most leisurely start, taking 11 min. 5 sec. to Willesden, which was passed at not over 49 m.p.h.; we picked up to 53 an hour at Wembley, touched 57½ at Watford, and mounted all the upper part of the Tring ascent at 52, taking 24¾ min. to Watford and 41 min. 5 sec. to Tring. A sustained rate of 71½ to 72½ m.p.h. past Cheddington and Leighton took us through Bletchley in 54 min. 40 sec., and Wolverton in exactly one hour, but speed fell to 50½ m.p.h. at Roade Summit and 52 at Kilsby Tunnel, so that our passing times were 67 min. 50 sec. to Roade, 77¾ min. to Weedon, and 91¾ min. to Rugby, where a very cautious slowing was made. Nuneaton was passed in 108¾ min., at 69 m.p.h., and after reducing speed over the colliery workings at Polesworth, we passed Tamworth in 121 min. 25 sec. and Lichfield in 128 min. 5 sec. Rugeley was cleared in 136¼ min., and Stafford, after the Colwich p.w. slowing, in 149 min. 5 sec.; Whitmore was breasted at the rather poor minimum, up a very gentle ascent, of 50½ m.p.h., in 166 min. 25 sec., and with no higher rate than 70½ m.p.h. on the descent, we took, as previously mentioned, 177 min. 50 sec. to Crewe.

By contrast, I had recently some very fair running behind one of the unrebuilt "Claughtons"—No. 5992—on the down day "Irish Mail" from Chester to Holyhead, with a 13-coach train weighing in all 395 tons. A strong wind from the south-west, in addition to increasing my apprehension as to the possible personal effects of the Irish Sea crossing, caught the train in exposed places, but did not appear to cause any great difficulty. The timing of this train is 100 min., on which we improved by 3½ min., though not getting down to the 93 min. which was once standard by most boat expresses from Chester to Holyhead. Times and speeds are tabulated, so that little remains

L.M.S. CHESTER-HOLYHEAD.

Engine: 4-6-0 "Claughton" No. 5992.
Load: 52 axles, 373 tons tare, 390 tons full.

| Distance. | | Schedule. | Actual. | Speeds. |
|---|---|---|---|---|
| miles. | | min. | m. s. | m.p.h. |
| 0·0 | Chester.. .. | 0 | 0 00 | — |
| 2·0 | Saltney Jc. .. | 4 | 4 20 | — |
| 5·8 | Sandycroft .. | — | 8 40 | 57½ |
| 8·9 | Connah's Quay | — | 11 50 | 61 |
| 12·4 | Flint .. .. | — | 15 10 | 64½ |
| 16·7 | Holywell Jc. .. | 20 | 19 20 | 62½ |
| 20·1 | Mostyn.. .. | — | 22 40 | 61 |
| 23·0 | Talacre.. .. | — | 25 25 | — |
| 26·4 | Prestatyn .. | — | 28 50 | — |
| 30·0 | Rhyl .. .. | 34 | 32 25 | 60 |
| 34·2 | Abergele .. | 39 | 37 00 | — |
| 37·9 | Llysfaen .. | — | 41 35 | 37½ |
| 40·3 | Colwyn Bay .. | 46 | 44 30 | 53½ |
| 44·4 | Llandudno Jc. | 51 | 48 45 | 61½ |
| 45·4 | Conway .. | — | 50 15 | *30 |
| 49·7 | Penmaenmawr | — | 56 05 | — |
| 52·4 | Llanfairfechan | — | 59 15 | 53½ |
| 54·5 | Aber .. .. | — | 61 40 | — |
| 59·7 | Bangor.. .. | 69 | 68 45 | 41 |
| 61·1 | Menai Bridge .. | — | 70 40 | 38½ |
| 63·2 | Llanfair .. | — | 73 35 | — |
| 66·0 | Gaerwen .. | 78 | 77 00 | 72½ |
| 72·5 | Bodorgan .. | — | 83 10 | 52½ |
| 81·0 | Valley .. .. | — | 91 35 | 69 |
| 84·4 | Holyhead .. | 100 | 96 30 | — |

* Service slack.

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to be said about the journey. It will be seen that the 24·2 miles from Sandycroft to Rhyl were covered in 23 min. 45 sec., the passing time of 32 min. 25 sec. to Rhyl being good; but from Abergele (passed 2 min. early) until we had crossed into Anglesey the going was leisurely. Later, we touched 72½ m.p.h. in Gaerwen "dip," and 69 an hour before Valley, which made for a fast finish from Llanfair. The run was the more creditable in that the engine had, as usual, worked through from Euston.

Making a sudden transition now to the Southern Railway, I want to mention a couple of runs, received from correspondents, which serve to show how the locomotives of the Central Division are handling the increasingly weighty 60-min. trains on the Victoria and Brighton service. Loads over 400 tons are now becoming tolerably common, especially since the introduction of corridor rolling-stock on certain of the workings. The down journey tabulated is of the more interest in that one of the "Atlantics" was used in replacement of a 4-6-0 "King Arthur," and practically succeeded

S.R. VICTORIA–BRIGHTON.

Engine: 4-4-2 No. 425, *Trevose Head.*
Load: 50 axles, 401 tons tare, 425 tons full.

| Distance. | | Schedule. | Actual. | Speeds. |
|---|---|---|---|---|
| miles. | | min. | m. s. | m.p.h. |
| 0·0 | Victoria .. | 0 | 0 00 | — |
| 2·7 | Clapham Jc. .. | — | 6 39 | — |
| 4·7 | Balham .. | 9 | 9 30 | 39 |
| 6·6 | Streatham Com. | — | 12 08 | 51½ |
| 10·5 | East Croydon .. | 15 | 16 56 | — |
| 13·6 | Purley .. .. | — | 20 39 | 48½ |
| 15·0 | Coulsdon .. | 21 | 22 30 | 48 |
| — | Quarry Tun. N. End .. | — | 25 41 | 46 |
| 18·8 | Quarry Box .. | — | 27 16 | — |
| 21·9 | Earlswood .. | 29 | 30 18 | — |
| 26·0 | Horley .. | — | 34 06 | 72 |
| 29·5 | Three Bridges .. | 37 | 37 34 | 57 |
| 31·9 | Balcombe Tun. Box .. .. | — | 40 14 | 50 |
| 34·1 | Balcombe .. | — | 42 29 | 65 |
| 38·0 | Hayward's Heath .. | 45 | 46 02 | 66½ |
| 41·1 | Keymer Jc. .. | 49 | 48 55 | — |
| 43·8 | Hassocks .. | — | 51 32 | — |
| 46·2 | Clayton S. End | — | 54 02 | 50 |
| 49·6 | Preston Park .. | — | 57 53 | — |
| 50·9 | Brighton .. | 60 | 60 47 | — |

S.R. BRIGHTON-VICTORIA.

Engine: 4-6-0 No. 803 ("King Arthur" class)
Load: 50 axles, 388 tons tare, 410 tons full.

| Distance. | | Schedule. | Actual. | Speeds. |
|---|---|---|---|---|
| miles. | | min. | m. s. | m.p.h. |
| 0·0 | Brighton .. | 0 | 0 00 | — |
| 1·3 | Preston Park .. | — | 3 40 | — |
| 4·7 | Clayton S. End | — | 9 05 | 42 |
| 7·1 | Hassocks .. | — | 11 45 | — |
| 9·8 | Keymer Jc. .. | 13 | 14 00 | 72 |
| 12·9 | Hayward's Heath .. | 16 | 16 50 | — |
| 15·8 | Balcombe .. | — | 20 45 | — |
| 19·0 | Balcombe Tun. Box .. .. | — | 23 05 | 54 |
| 21·4 | Three Bridges .. | 25 | 25 20 | — |
| 24·9 | Horley .. .. | — | 28 25 | 70 |
| 29·0 | Earlswood .. | 32½ | 32 30 | 53 |
| 32·1 | Quarry Box .. | — | 36 05 | 47 |
| 34·1 | Star Lane Box | — | 38 30 | — |
| 37·3 | Purley .. .. | — | 41 50 | 64½ |
| 40·4 | East Croydon .. | 46 | 44 50 | — |
| 44·3 | Streatham Com. | — | 49 20 | — |
| 46·0 | Balham .. | 52 | 52 00 | — |
| | | | Sigs. | 20 |
| 48·2 | Clapham Jc. .. | 55 | 54 55 | — |
| | | | Sigs. | 20 |
| 50·9 | Victoria .. | 60 | 61 20 | — |

in keeping time, despite the fact that the "Southern Belle" had been made up to nine Pullmans and two brakes, weighing 401 tons empty and 425 tons full. Time was lost at the start by the engine slipping badly up the 1 in 64 to Grosvenor Bridge—here is where the increased adhesion of six-coupled wheels is of material value—during which speed fell to 10 m.p.h. But a quick recovery followed, and the train was a bare minute behind at East Croydon. The tabulated particulars of the running make it unnecessary to say much by way of comment, except to draw attention to the excellent running from Croydon up to Quarry Tunnel, a minimum of 46 m.p.h. up the final 1 in 165, after the continuous 1 in 264 ascent, being excellent. Easy subsequent running to Earlswood was doubtless due to the necessity for getting the water-level up in the boiler after this hard work. But for working so lengthy a train slowly round the sharp curve into Brighton terminus, the stop would doubtless have been made in the even hour; as it was, the excess over schedule was only 47 sec.

On a return journey to London, No. 803

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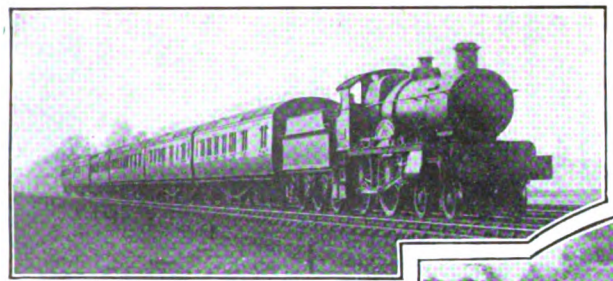
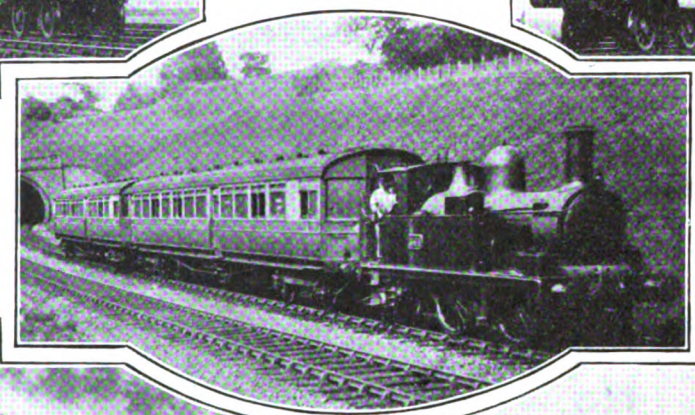
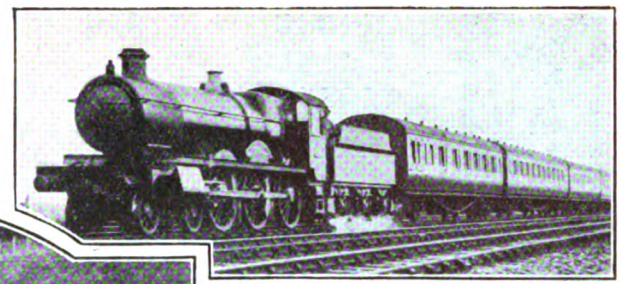


**UP WORCESTER EXPRESS.**
4-4-0 No. 3815 *County of Hants.*
*Photo. M. W. Earley.*

**G.W.R. MOTOR TRAIN.**
0-4-2T No. 544.
*Photo. H. L Salmon.*





**DOWN STOPPING TRAIN.**
4-6-0 No. 2925 *Saint Martin* (rebuilt).
*Photo. M. W. Earley.*

**TRAIN PASSING KNOWLE.**
4-4-0 No. 3404 *Barbados.*
*Photo. W. Leslie Good.*

**UP "CORNISH RIVIERA" NEAR TAUNTON.**
4-6-0 No. 6010 *King Charles I.*
*Photo. F. R. Hebron.*

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G.W.R. CRUSADERS' UNION TRIPS: PADDINGTON—SWINDON.

| Distance. | Engine .. .. | 4-cylinder 4-6-0 No. 6000 *King George V.* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Driver .. .. | Schedule. | Wasley | Ruddock | Wimhurst | Distance. | Schedule. | Wasley | Ruddock | Wimhurst |
| | Fireman .. | | Hampshire | Gleed | Martin | | | Hampshire | Gleed | Martin |
| | Load (tons tare) | | 476 | 436 | 436 | | | 476 | 436 | 436 |
| | ,, ( ,, full) | | 510 | 460 | 465 | | | 510 | 460 | 465 |
| miles. | | min. | m. s. | m. s. | m. s. | miles. | min. | m. s. | m. s. | m. s. |
| 0·0 | Paddington .. | 0 | 0 00 | 0 00 | 0 00 | 77·3 | 80 | 83 25 | 83 00 | 74 20 |
| | | | | | | | | sigs. | | sigs. |
| 1·3 | Westbourne Pk. | — | 3 30 | 3 25 | 3 30 | 76·0 | — | 79 40 | 80 15 | 70 50 |
| | | | | | | | | | | sigs. |
| 4·3 | Acton .. .. | — | 7 30 | 7 40 | 7 50 | 73·0 | — | 76 35 | 77 00 | 67 10 |
| 5·7 | Ealing .. .. | — | 9 05 | 9 20 | 9 25 | 71·6 | — | 75 20 | 75 30 | 65 55 |
| 9·1 | Southall .. | 12 | 12 35 | 12 55 | 12 55 | 68·2 | 68 | 72 15 | 72 10 | 63 05 |
| 13·2 | West Drayton .. | — | 16 30 | 17 00 | 16 50 | 64·1 | — | 68 25 | 67 30 | 59 30 |
| 18·5 | Slough .. .. | 21 | 21 00 | 21 45 | 21 25 | 58·8 | 59 | 63 40 | 60 10 | 55 00 |
| | | | | | | | | | sig. stop | |
| 24·2 | Maidenhead .. | 27 | 25 55 | 27 10 | 26 25 | 53·1 | 54 | 58 35 | 51 50 | 50 15 |
| 31·0 | Twyford .. | — | 31 45 | 33 25 | 32 20 | 46·3 | — | 52 30 | 45 40 | 44 40 |
| 36·0 | Reading .. | 39 | 36 15 | 38 05 | 36 40 | 41·3 | 42 | 48 00 | 41 10 | 40 20 |
| 41·5 | Pangbourne .. | — | 41 15 | 43 05 | 41 20 | 35·8 | — | 43 10 | 36 30 | 35 35 |
| | | | | | | | | | | sig. slt. |
| 48·5 | Cholsey .. | — | 47 45 | 49 30 | 47 10 | 28·8 | — | 37 05 | 30 30 | 29 30 |
| 53·1 | Didcot .. .. | 56 | 52 15 | 53 40 | 51 10 | 24·2 | 25 | 32 55 | 26 25 | 25 30 |
| 56·5 | Steventon .. | 60 | 55 35 | 56 55 | 54 10 | 20·8 | 21 | 29 40 | 23 30 | 22 40 |
| 60·4 | Wantage Road | — | 59 30 | 60 35 | 57 45 | 16·9 | — | {23 55 / 23 00} | 20 05 | 19 15 |
| | | | | | | | | sigs. | | |
| 63·9 | Challow .. | — | 63 00 | 63 55 | 61 10 | 13·4 | — | 16 40 | 17 00 | 16 15 |
| | | | | | | | | sigs. | | |
| 66·5 | Uffington .. | — | 65 35 | 66 25 | 63 45 | 10·8 | — | 13 55 | 14 30 | 13 50 |
| | | | sigs. | sigs. | | | | | | |
| 71·6 | Shrivenham .. | — | 72 35 | 71 50 | 68 45 | 5·7 | — | 8 55 | 9 20 | 9 00 |
| | | | | sig. stop | | | | | | |
| 77·3 | Swindon .. | 80 | 81 35 | 81 20 | 75 25 | 0·0 | 0 | 0 00 | 0 00 | 0 00 |
| 77·3 | Net times (min.) | 80 | 77½ | 77½ | 75½ | 77·3 | 80 | 75 | 75½ | 72½ |

of the "King Arthur" class had to handle the same coach formation, but my friend in this case gives the gross weight as 410 tons; presumably there was some variation in the Pullman stock employed, as on the down journey my former correspondent carefully detailed the weight of each vehicle. As is often the case with the "King Arthurs," the start up to Clayton was on the leisurely side, speed not having exceeded 42 m.p.h. when the train entered the tunnel, but thereafter excellent work was done, the minimum speeds of 54 m.p.h. at Balcombe Summit and 47 at Quarry Summit being specially worthy of remark. The train was not permitted a clear run into Victoria, but the gross time of 61 min. 20 sec. may be curtailed to a net figure of 59 min., when due allowance has been made for the delays from Balham onwards.

In conclusion, and in order that the four groups may all have received attention before I conclude this miscellany, I propose to describe the working of the special trains which were run between Paddington and Swindon for the monster excursion of the Crusaders' Union in January last. The train worked down and up on January 3rd was, I believe, the heaviest that has been used on one of these trips, consisting as it did of thirteen bogies, three of them the latest 50-seater dining cars and exclusively 70 ft. stock. The empty weight of this formation was 476 tons, and with the freight of 720 passengers (most of them boys), I reckoned



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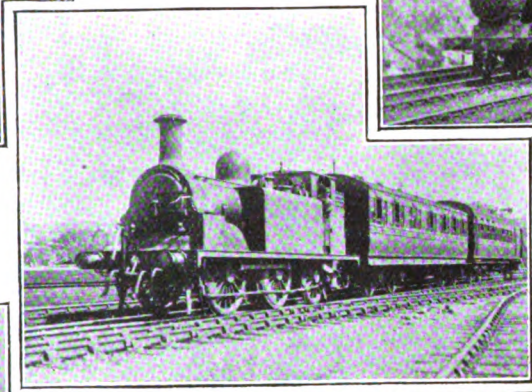
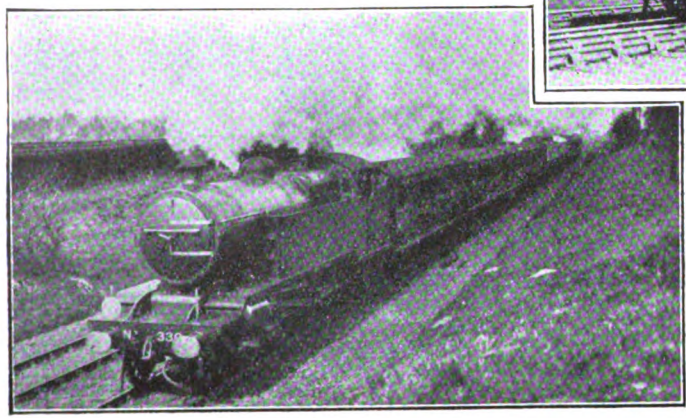
UP BOURNEMOUTH TRAIN AT REDBRIDGE.
4-6-0 No. E851 *Sir Francis Drake.*
*Photo. C. E. Hawksworth.*



AUTO-TRAIN
ENTERING OXTED.
0-4-2T No. B215.
*Photo. P. Ransome-Wallis.*

LOCAL GOODS TRAIN.
0-6-2T No. B558.
*Photo. H. Gordon Tidey.*



DOWN BRIGHTON EXPRESS NEAR HASSOCKS.
4-6-4T No. B330.
*Photo. H. Gordon Tidey.*

DOWN EASTERN SECTION TRAIN.
4-4-0 and 0-6-0 locomotives.
*Photo. H. Gordon Tidey.*

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the gross weight behind the tender as 510 tons. A coach less sufficed on the remaining two days, and with a slight variation in the passenger complement, the total tonnage came down to 460 and 465 tons on these two occasions. The engine *King George V* was employed for each trip, and Chief Inspector Robinson accompanied the three different crews who were responsible.

A semi-fast train from Wolverhampton to Weymouth preceded the special from Didcot to Swindon, and was due at the latter station only 7 min. in advance; signals from this caught us at Shrivenham, where we were running ahead of time, on the first two trips, and prevented a punctual arrival. But no mistake was made on the third day. The telephone was put in operation and the Weymouth driver was urged at Oxford to make a good run; he must certainly have broken some records, as we cleared Steventon nearly 6 min. ahead of time, but never "saw a signal" (metaphorically, I need hardly add!) from there to Swindon, where, on drawing up 4½ min. early, in 75 min. 25 sec. from Paddington, we found the Weymouth train duly awaiting us. On the two first up journeys also we were unfortunate, being stopped at Wantage Road for a laggard train of milk empties ahead on the first day, and getting a bad signal check near Slough on the second, when the weather conditions were very misty. But once again the progress on the third up trip was triumphant indeed, when, despite signal checks inwards from Acton, we stopped dead at Paddington in 74 min. 20 sec. from Swindon, Driver Wimhurst having worked this 465-ton train over the 77·3 miles in a net time of 72¾ min., start-to-stop. On this occasion the famous engine maintained an average speed of exactly 70 m.p.h. for a continuous distance of 62·2 miles, from Uffington to Acton, covered in an actual time of 53 min. 20 sec.—and this over a practically level track, with 465 tons behind the tender! It is also noteworthy that on each of six journeys we succeeded in bettering "even time" from the start.

Driver Wasley made an excellent exit from Paddington on the first trip—as far as Pangbourne the best of the three, despite the 510-ton train load. We were doing 60 m.p.h. at Southall, 67 at West Drayton and 72½ at Slough; subsequent speeds were 67 at Twyford and Reading. After that the rate gradually diminished, but up the gradual rise from Didcot we never fell below 60 until the first bad signal check between Uffington and Shrivenham. Driver Ruddock started more easily, passing Southall at 59 m.p.h., West Drayton at 64½, Slough at 67, and then sustaining a steady 65 most of the way from there to Didcot, after which 64½ an hour was maintained all the way up the faint ascent to Shrivenham, where once again the signal checks spoiled the finish of the run. Driver Wimhurst also started moderately, but after Southall the acceleration was rapid, speed being 69 m.p.h. at West Drayton, 71½ at Slough, 69 past Maidenhead and Twyford, 72½ at Reading, and no less than 74 m.p.h. at Tilehurst, whence we maintained 71½ practically the whole way to Didcot. By running the 47·4 miles from Southall to Steventon in 41¼ min., Driver Wimhurst gained no less than 6¾ min. over this section. At Shrivenham, where we had covered 71·6 miles from the start in 68¾ min., we were still doing 64½ m.p.h., and had this been a Bristol 2-hour train, we could have passed Swindon at speed in 74 min. easily. As it was, with a very slow stop to draw the long train to the platform, we arrived 4½ min. early.

Coming back, Driver Wasley had reached 64½ m.p.h. when there came the first check, at Uffington, prior to the Wantage Road stop. From there we covered the 60·4 miles to Paddington in 59½ min., start-to-stop, or 58½ min. net, passing Didcot at 64½ m.p.h., Cholsey and Goring at 69, Tilehurst at 70½, Reading at 71½, Twyford at 66, Maidenhead at 69 and Slough at 70½—and this with 510 tons. Driver Ruddock made a more leisurely start, as in the down direction, but passed Uffington at 64½ m.p.h., Wantage Road at 69, Didcot at 71½, Cholsey at 69, Pangbourne at 71½, and Reading at 72½, after which the engine had to be eased because of the fog, which was later the cause of our signal stop outside Slough. The exhibition given by Driver Wimhurst in the up direction was wonderful. We were doing 60 m.p.h. at Shrivenham, 65 at Uffington, 70½ at Wantage Road, 71½ at Didcot, 72½ at Cholsey, immediately



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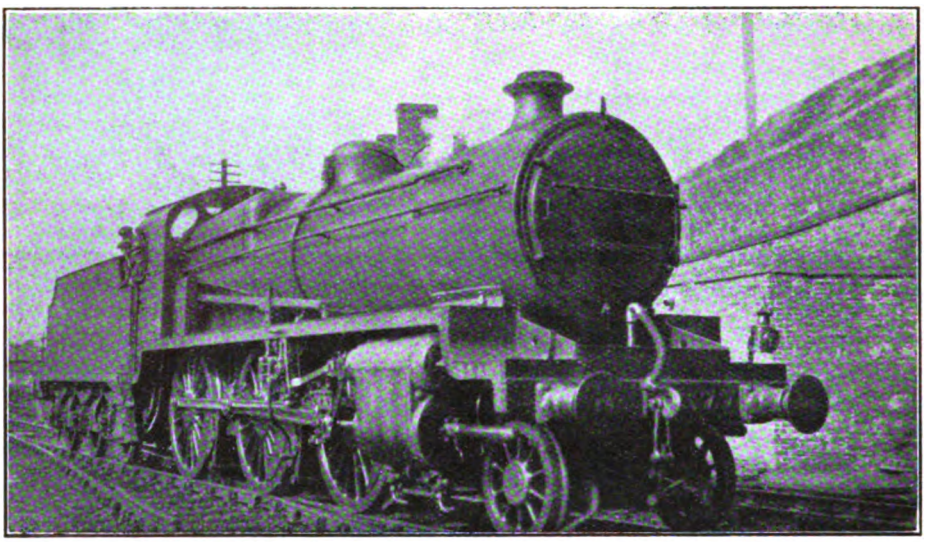

*Photo.*] [*W. H. C. Kelland.*

**2-6-0 No. 377 AT WATERFORD, GREAT SOUTHERN RAILWAYS, IRELAND.**

after which a slight signal check brought us down to 65, 69 at Pangbourne, 71½ at Reading, 68 at Sonning Cutting, 70½ at Twyford, 72½ at Maidenhead, 71½ at Slough, 69 at West Drayton, and 68 at Southall. These runs are the more noteworthy in that the engine in every case, both down and up, was starting "cold." I regret that lack of space forbids me to mention other fine runs timed by correspondents on these remarkable excursion trips, when the loads have been lighter and the speeds even higher.

Acknowledgment of letters received is due to J. T. Auld, A. W. Smith, W. A. Tuplin, F. G. Rawlins, Major H. Myers, G. N. Martin, H. Dixon Hewitt, G. E. H. Roberts-Hay-Boyd, H. W. Bothamley, A. G. Robins, H. J. J. Griffith, Howard Williams, and A. H. Hastie, to the last-mentioned of whom I must tender my apologies for having confused his name with that of the driver of whom he wrote in eulogistic terms! The driver responsible for the fine "Royal Scot" run on the up "Lakes Express," mentioned in my February article, was Morcher, and the fireman Harris, both of Camden Shed. Conversely, I have also a diverting letter from A. B. Duncan, in which the writer proves, beyond a shadow of doubt, that, in the course of his pupilage at St. Rollox Works, he was, in part, responsible for firing the "Royal Scot" engine *Liverpool* on the best of the northbound trips of the "Royal Scot" from Carlisle that I described in the same article. In particular he fired from Wamphray to Beattock Summit, and I congratulate him in that the engine was blowing off when passing the Summit Box. The driver's name was Kay, and not Mackay, as misstated by me, and despite leaving Carlisle 25 minutes late, he brought his train into Glasgow at 6.23 p.m., only 8 minutes late by the public times, and 13 minutes late by working times—an excellent achievement.

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# The Main Line Gradients of British Railways.

By "VOYAGEUR."

## IV.—LONDON & NORTH EASTERN RAILWAY: GREAT CENTRAL SECTION (INCLUDING MAIN LINES OF CHESHIRE LINES JOINT COMMITTEE).

A CASUAL glance at the profile of the main line of the late Great Central Railway is sufficient to emphasise the extraordinary merit of the express schedules which are maintained over it. Such timings would be practically impossible but for the comparative lightness of the loading of most of these trains, which between Sheffield and Marylebone generally consist of between five and seven bogie vehicles of heavy modern stock, weighing with passengers and luggage from 180 to 215 or 220 tons. In addition to gradient difficulties, it will be seen that the various routes profiled are liberally provided with service slacks, which act as a further obstacle in the way of the maintenance of high speed. Of all the long-distance main lines out of London, indeed, it can hardly be contended that the Great Central is, on the whole, the most difficult. On the journey of 206 miles from Marylebone to Manchester, indeed, the total vertical rise to be surmounted by the locomotives amounts to no less than 3,140 ft. With the Great Central profiles proper are included those of the two chief main lines of the Cheshire Lines Committee, in view both of the fact that they logically continue the Great Central main line from London, and also that the Great Central section of the L.N.E.R. provides the locomotive power for working their trains.

### *LONDON (MARYLEBONE) TO MANCHESTER (LONDON ROAD AND CENTRAL).*

For convenience in following up the distances, the loop routes—from Neasden to Grendon Underwood *via* High Wycombe and Heath to Staveley Town *via* Chesterfield—are inset in the main distance tables, as also the branches from Banbury to Culworth Junction and Fairfield to Manchester Central. A curious point about the mile-posts is that on all the Great Central sections proper the zero point is Manchester (London Road), where were located the head offices of the one-time Manchester, Sheffield and Lincolnshire Railway, and from which, after the extension to London had been opened in 1899, the bulk of the Great Central business was still carried on. After the interpolation of Metropolitan mile-posts, measured from Baker Street, over the joint section of line from Quainton Road to Harrow, the Manchester measurement is resumed when the Great Central trains get on to their own metals again, from Harrow to Marylebone. Even the short Northolt to Neasden spur is similarly measured in what seems to be a backward direction, the zero point being Northolt and not Neasden. The whole line has now been remeasured from the London end, but nothing has yet been done towards the alteration accordingly of the mile-posts.

Right from the start the gradients are very severe. There is a short strip at 1 in 100 practically off the platform end at Marylebone, followed by more at the same inclination up to the point where the L.M.S. "Outer Circle" is crossed near Kilburn. From Preston Road up to Harrow 1 in 91–93 is the grade for the bulk of 2 miles. Then, after falling to Pinner and surmounting the summit at Northwood on somewhat easier grades, the engines are faced with a very severe slack over the curve through Rickmansworth, as a preliminary to the 6½-mile



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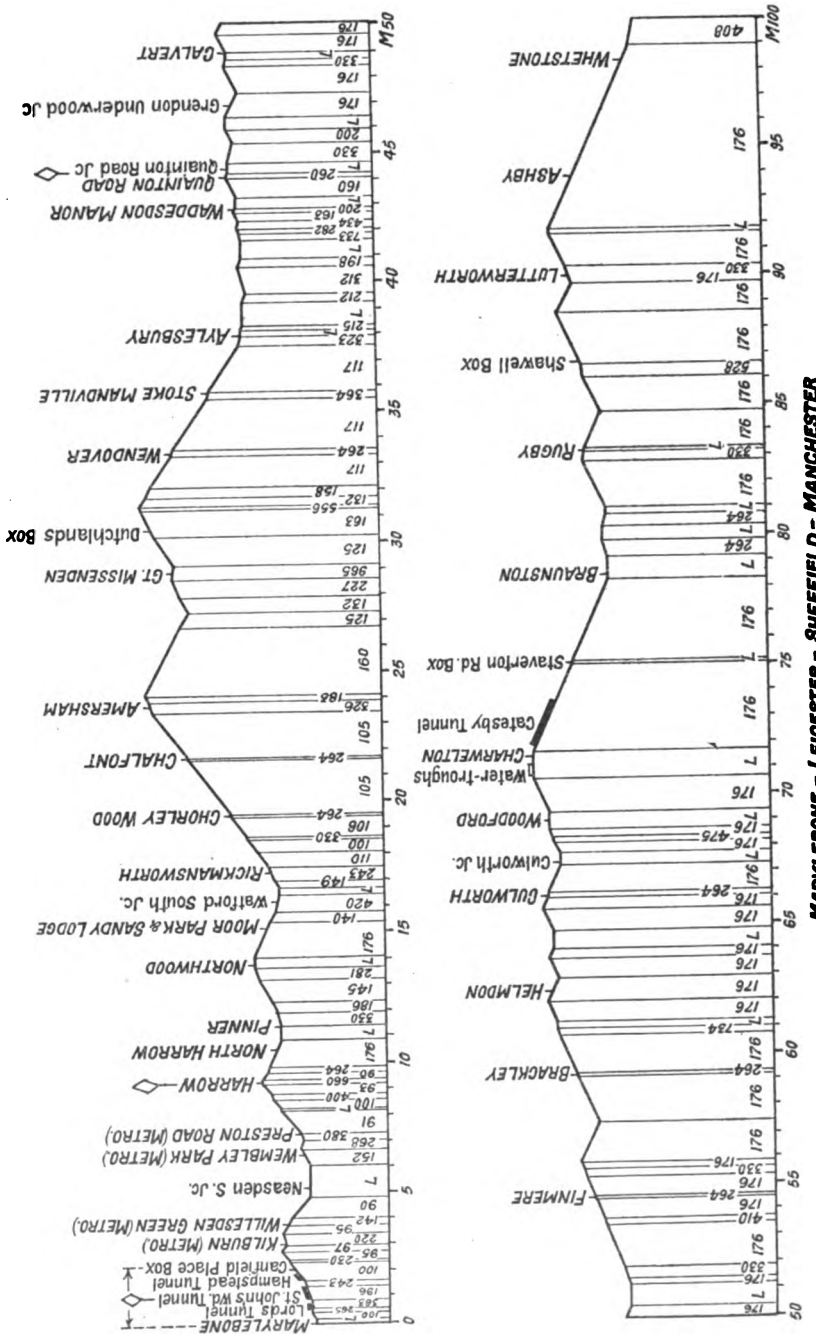


**SHEET 13.—GRADIENT PROFILES, LONDON & NORTH EASTERN RAILWAY.**

**MARYLEBONE – LEICESTER – SHEFFIELD – MANCHESTER**

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ascent to Amersham, almost entirely at 1 in 105. The next "peak," near Dutchlands signal-box, is at the same altitude as Amersham, but the dip between them can fortunately be taken at full speed, so that the reduction of speed at Dutchlands with down expresses is not usually below 50 m.p.h. Lastly, an abrupt 6-mile descent off the Chiltern Hills to Aylesbury, precedes the level run across the Vale of Aylesbury to the divergence from the joint metals of the Great Central route proper, at Quainton Road Junction. The junction here has recently been greatly improved, and the reduction of speed required is considerably less than once it was. But it may well occasion astonishment, when the profile is studied of the first 38 miles out of Marylebone, that such a course is included in schedules well in excess of 55 miles an hour.

It was to allow of heavier passenger and freight loadings to and from London that the Great Central Railway combined with the Great Western, who desired a shorter route to Birmingham and the north, in building the Great Western and Great Central Joint Line between Northolt Junction and Ashendon Junction. It is very singular that this line shortens the Great Western Birmingham route, at the expense of grading, whereas it eases the Great Central grading, but in this case at the expense of distance, the Wycombe route from Marylebone being 4½ miles longer than the Aylesbury route. The steepest adverse gradients, as will be seen, are the 1 in 164 and 1 in 167 stretches by which the summit of the Chilterns is reached, between High Wycombe and Princes Risborough; there are short lengths of steeper inclination on the down road—1 in 62 before Northolt and 1 in 100-88 approaching Princes Risborough—but these do not have to be climbed by up trains, as the up line is carried along a different, and, incidentally, very slightly shorter, location in each case. The Northolt and High Wycombe slacks have a hampering effect on the running, in particular, of down expresses, as in both cases they precede lengthy rising gradients.

From Grendon Underwood Junction, where the two routes reunite, the ruling gradient of the Great Central London Extension—1 in 176—is maintained with scarcely any variation anywhere. There are, as will be seen, some very considerable lengths of it, notably up past Finmere and Brackley, and then the 6¾-mile descent from Charwelton to Braunston and the 7-mile drop past Ashby and Whetstone, in the two latter instances continuous. Fortunately, there is every encouragement to safe running at the highest speeds, of which drivers take full advantage on the falling gradients, the impetus so obtained helping them considerably on those that are adverse. The spur connecting the Great Western Railway at Banbury with the Great Central at Culworth is considerably steeper, the four-mile climb from Bambury Junction past Chalcombe Road steepening from 1 in 211 to 1 in 100. Timers should be warned that all the stations from Calvert to Hucknall Central inclusive (Arkwright Street and Victoria, Nottingham, alone excepted), are of the island platform type, between the up and down roads, and can very easily be missed by anyone looking for the platforms on the normal side of the track.

The Great Central ruling grade of 1 in 176 ceases at Nottingham, and gives place to 1 in 130–132 for almost all the 10·7 miles from Victoria to Kirkby South Junction, followed by a descent of 8 miles from Pilsley to Staveley Town, which for 5 miles of its length is as steep as 1 in 100. But such figures pale beside the mountainous climbs from Sheffield and Manchester to the summit at the eastern exit from Woodhead Tunnel. As the profile reveals, the grade is without a break for 19½ miles from the Sheffield side, and mostly at or about 1 in 130; on the west side it is more broken, but considerably steeper in parts, as the 1 in 117 for 5 miles from Woodhead, and the 2½ miles beyond at 1 in 100, bear witness. The steepest pitch is the short 1 in 97-77 from Hyde Junction towards Guide Bridge, making an awkward start for up trains from the latter place. The concluding descents from Guide Bridge into the Central and London Road stations at Manchester appear in profile on Sheet 16.

### *MANCHESTER (CENTRAL) TO LIVERPOOL (CHESHIRE LINES COMMITTEE).*

The tight schedules in force over this, the principal main line of the C.L.C.,



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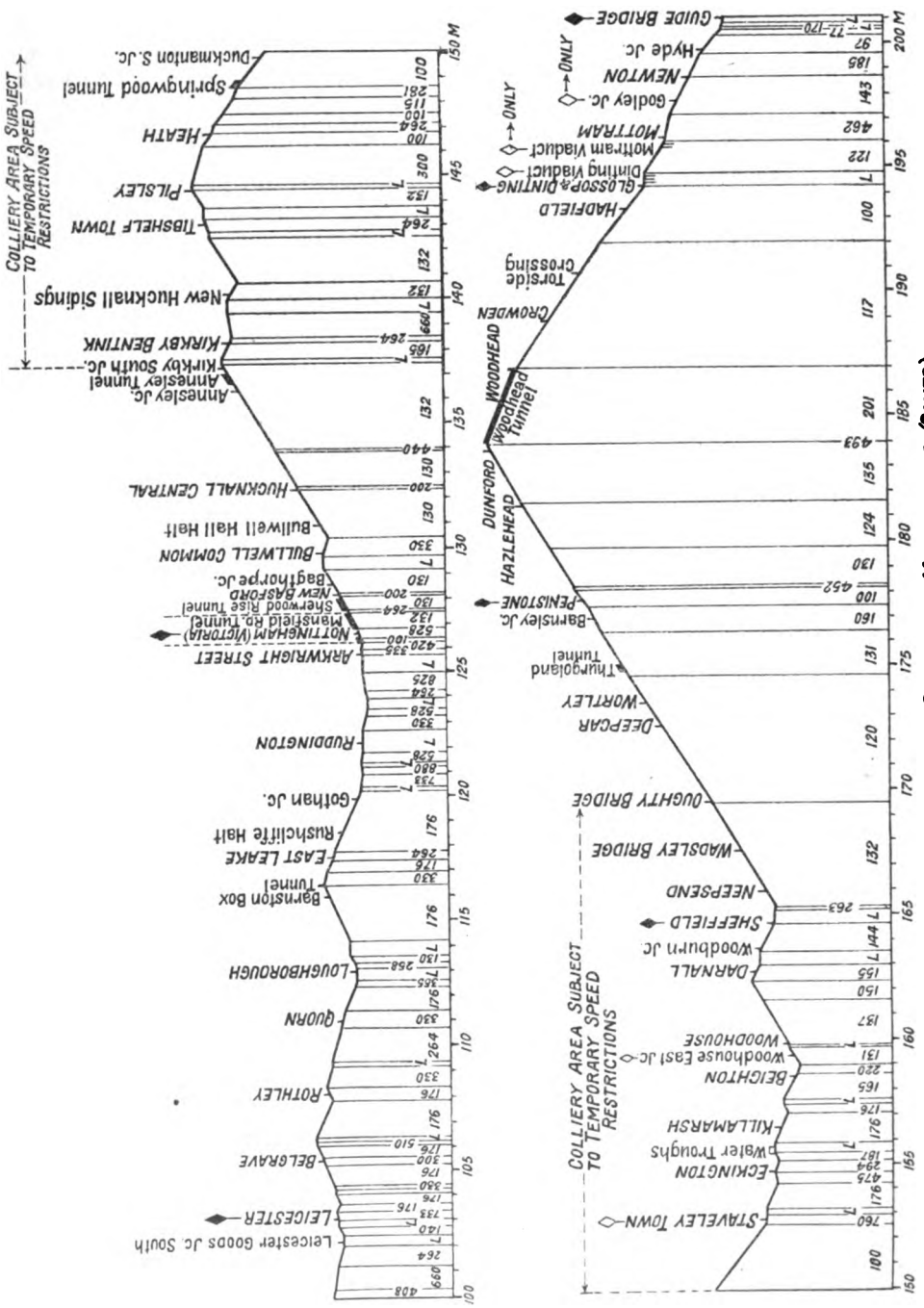


**MARYLEBONE - LEICESTER - SHEFFIELD - MANCHESTER (CONTD.)**

SHEET 14.—GRADIENT PROFILES, LONDON & NORTH EASTERN RAILWAY.

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involve some commendably hard locomotive work over sharply undulating gradients. Of these the steepest is the 1 in 100 descent out of Manchester Central, which gives an excellent start to westbound trains. Eastbound trains are not so fortunate, as they have to start from Liverpool up a short rise at almost exactly the same figure. There are also some lengthy stretches inclined at between 1 in 185 and 195 between Warrington and Liverpool, up to the twin summits at Farnworth and Hunt's Cross, which account for the slightly easier timings of the hourly trains between Warrington and Liverpool than those in force east of Warrington. The attention of readers may here be called to the fact that recently a number of the 45-min. expresses have had additional stops at Farnworth included in their schedules, but without any increase of overall journey time, necessitating some very hard locomotive running.

### *GODLEY JUNCTION TO GLAZEBROOK.*

This is the route followed by the London and North Eastern direct express service between Hull, Sheffield and Liverpool. It begins, as the profile shows, with a tremendously steep descent from Godley to Stockport, with several very severe speed restrictions through junctions, but from Stockport to Glazebrook, where the Manchester-Liverpool line is joined, there is little to call for remark. The 1 in 135 "hump" over the Manchester Ship Canal, as is the case of the similar Irlam "hump" on the Manchester-Liverpool route, should, however, be noted; prior to the construction of the canal both lines here were practically level, and the old routes can, indeed, be traced without difficulty alongside the present embankments.

### *WOODHOUSE JUNCTION TO RETFORD.*

The interest of this route, from the speed point of view, lies more in the past than in the present. It formed the means of access by the late Great Northern Railway to both Sheffield and Manchester, and figured in some fierce speed contests of years gone by between the Great Northern, Midland and London and North Western Railways. Even in London and North Eastern times it has been used by the non-stop "Sheffield Pullman" during the short life of that luxury train. To-day the principal service routed over it is the "North Country Continental," on its journey between Liverpool and Harwich, and it may be added that the remainder of the route used by that express, from Retford onwards, will figure in the next issue. The chief grading feature of this short section is the stiff climb at 1 in 115 past Waleswood, followed by the 7-mile descent, on easier and more broken grades, to beyond Worksop. The extremely severe slack at Whisker Hill Junction operates only in the case of trains proceeding from there round the exceptionally sharp curve into Retford Station; trains taking the straight line across the level crossing with the main East Coast route make a less severe slowing.

### *SHEFFIELD TO YORK.*

The Sheffield and York route, followed by the Penzance-Aberdeen, Barry-Newcastle, the Bournemouth-Newcastle and other important through services, is one of exceptional difficulty. For its extraordinary sinuousness between Attercliffe and Dearne Junction it would be hard to find a parallel among main lines, and there is, in fact, a general speed restriction over the whole of this length, added to by the six other service slacks at the various points shown, almost all of which are of exceptional severity. The culmination comes in the passage of the remarkable Mexborough West curve, just beyond Swinton Station, which is subject to a restriction of 6 m.p.h. Over the Swinton and Knottingley Joint Line, from Dearne Junction to Ferrybridge, the ruling grade is round about 1 in 150, the longest continuous stretches of which are the $3\frac{1}{4}$ miles up to Frickley, and the concluding $2\frac{3}{4}$ miles to Ferrybridge. After the metals of the old North Eastern are joined here, the difficulties of the engine are over, and there from Milford Junction is nothing but level and straight travelling on to York, though frequently it is necessary to slow severely at Church Fenton to cross over from one set of tracks to the other.

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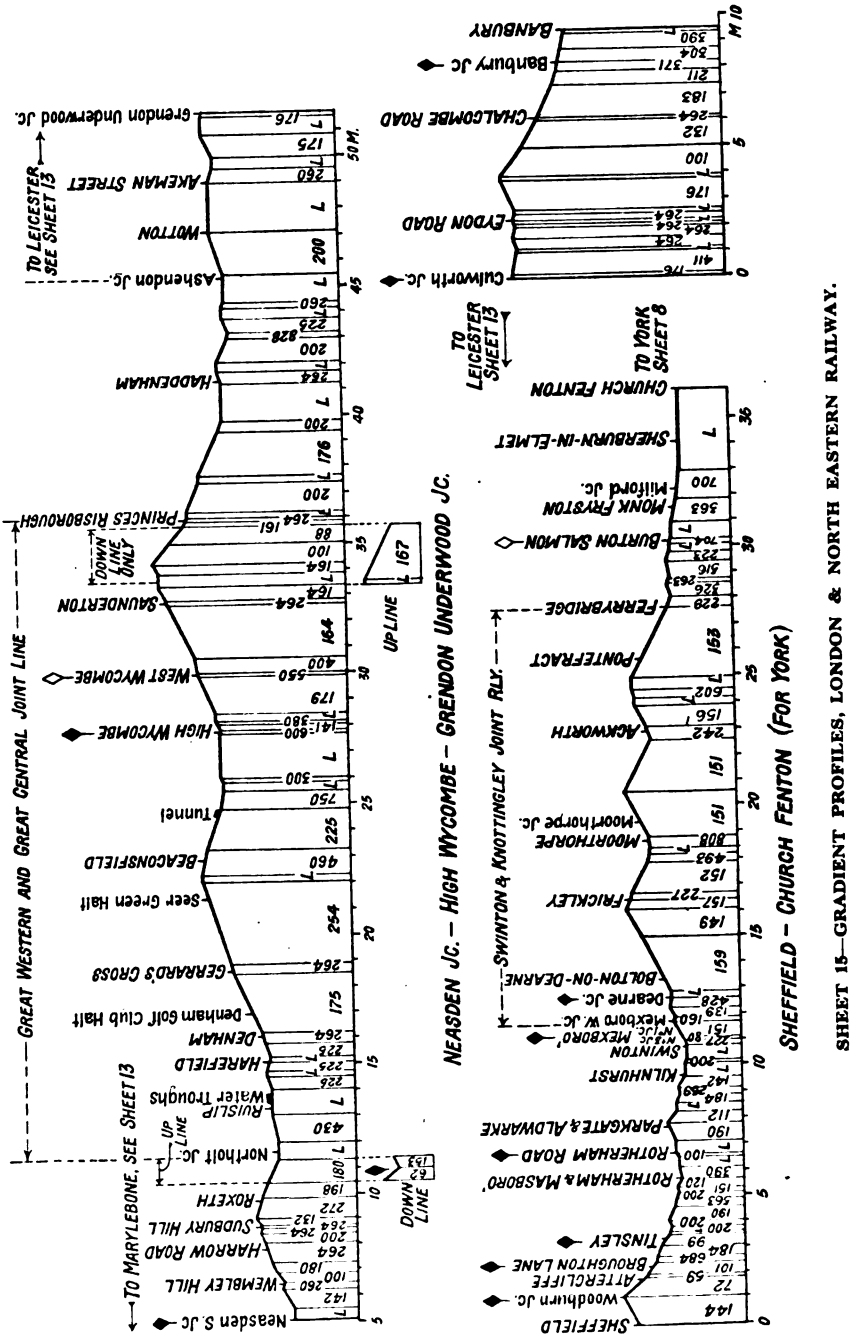


SHEET 15—GRADIENT PROFILES, LONDON & NORTH EASTERN RAILWAY.

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**London (Marylebone) to Manchester (London Road and Central) (Sheets 13 and 14).**

*Mile-posts, up side, Manchester (London Road) to Quainton Road Junction and Ashendon Junction and Harrow to Marylebone, from zero at Manchester; down side, Harrow to Quainton Road, from zero at Baker Street (Met. Rly.); up side Neasden Junction to Northolt Junction (zero); up side Northolt Junction (zero) to Ashendon Junction; up side Culworth Junction to Banbury Junction.*

| | Miles. | Miles. |
|---|---|---|
| LONDON (MARYLEBONE) .. | 0·0 | 0·0 |
| *Canfield Place (down)* .. .. | 1·9 | 1·9 |
| Brondesbury (Met. Station, up side) .. .. .. | 3·0 | 3·0 |
| *Neasden South Junction (down)* .. | 5·1 | 5·1 |
| Wembley Hill (Sheet 16) .. | 6·5 | |
| Sudbury Hill and Harrow Road | 7·9 | |
| Sudbury Hill, Harrow .. | 8·8 | |
| South Harrow and Roxeth .. | 9·8 | |
| NORTHOLT JUNCTION .. | 11·6 | |
| Ruislip .. .. .. | 13·4 | |
| Harefield Halt .. .. | 15·1 | |
| Denham .. .. .. | 16·1 | |
| Denham Golf Club Halt .. | 17·0 | |
| Gerrard's Cross .. .. | 18·7 | |
| Seer Green Halt .. .. | 21·4 | |
| Beaconsfield .. .. .. | 23·0 | |
| *Tyler's Green (up)* .. .. | 25·4 | |
| HIGH WYCOMBE .. .. | 27·9 | |
| West Wycombe .. .. | 30·1 | |
| Saunderton .. .. .. | 32·8 | |
| PRINCES RISBOROUGH | 36·0 | |
| Haddenham .. .. .. | 41·4 | |
| *Ashendon Junction (up)* .. | 45·4 | |
| Wotton .. .. .. | 46·8 | |
| Akeman Street .. .. | 48·7 | |
| Wembley Park (Met. Station, up side) | | 6·4 |
| Preston Road ,, ,, .. | | 7·2 |
| HARROW-ON-THE-HILL .. .. | | 9·2 |
| North Harrow .. .. .. .. | | 10·5 |
| Pinner .. .. .. .. | | 11·4 |
| Northwood .. .. .. .. | | 13·7 |
| Moor Park and Sandy Lodge .. .. | | 15·1 |
| *Watford South Junction (up)* .. .. | | 16·1 |
| Rickmansworth .. .. .. .. | | 17·2 |
| Chorley Wood .. .. .. .. | | 19·4 |
| Chalfont Road .. .. .. .. | | 21·6 |
| Amersham .. .. .. .. | | 23·6 |
| Great Missenden .. .. .. | | 28·8 |
| *Dutchlands (up)* .. .. .. | | 30·5 |
| Wendover .. .. .. .. | | 33·3 |
| Stoke Mandeville .. .. .. | | 35·7 |
| AYLESBURY .. .. .. .. | | 37·9 |
| Waddesdon Manor .. .. .. | | 42·8 |
| Quainton Road Junction (station) .. | | 44·1 |
| *Grendon Underwood Junction (up)* | 55·3 | 46·8 |
| Calvert .. .. .. .. | 53·3 | 48·8 |
| Finmere .. .. .. .. | 59·0 | 54·5 |
| Brackley .. .. .. .. | 63·8 | 59·3 |
| Helmdon .. .. .. | 67·0 | 62·5 |
| Culworth .. .. .. | 70·6 | 66·1 |

| | Miles. |
|---|---|
| BANBURY .. .. | 0·0 |
| *Banbury Junction* .. | 1·2 |
| Chalcombe Road .. | 3·3 |
| Eydon Road .. .. | 7·1 |

| | | |
|---|---|---|
| *Culworth Junction (up)* .. | 9·4 | 71·8 67·3 |
| WOODFORD & HINTON | 11·2 | 73·6 69·1 |

| | Miles. | Miles. |
|---|---|---|
| Charwelton .. .. .. | 76·0 | 71·5 |
| *Staverton Road (down)* .. .. | 79·7 | 75·2 |
| Braunston & Willoughby .. | 83·0 | 78·5 |
| RUGBY .. .. .. .. | 87·7 | 83·2 |
| *Shawell (up)* .. .. .. | 91·3 | 86·8 |
| Lutterworth .. .. .. | 94·5 | 90·0 |
| Ashby .. .. .. .. | 98·4 | 93·9 |
| Whetstone .. .. .. | 102·9 | 98·4 |
| *Leicester Goods Junction South* .. | 106·6 | 102·1 |
| LEICESTER .. .. .. | 107·6 | 103·1 |
| Belgrave .. .. .. .. | | 105·4 |
| Rothley .. .. .. .. | | 108·1 |
| Quorn and Woodhouse .. .. | | 110·9 |
| LOUGHBOROUGH .. .. | | 113·0 |
| *Barnston (down)* .. .. .. | | 116·0 |
| East Leake .. .. .. .. | | 117·5 |
| Rushcliffe Halt .. .. .. .. | | 118·4 |
| *Gotham Junction (up)* .. .. .. | | 119·9 |
| Ruddington .. .. .. .. | | 122·1 |
| Arkwright Street .. .. .. | | 125·6 |
| NOTTINGHAM VICTORIA .. .. | | 126·5 |
| New Basford .. .. .. .. | | 128·1 |
| *Bagthorpe Junction (up)* .. .. | | 128·6 |
| Bulwell Common .. .. .. | | 129·8 |
| Bulwell Hall Halt .. .. .. | | 130·9 |
| Hucknall Central .. .. .. | | 132·3 |
| *Annesley North Junction (up)* .. .. | | 136·3 |
| *Kirkby South Junction (up)* .. .. | | 137·2 |
| Kirkby Bentinck .. .. .. | | 138·2 |
| *New Hucknall Sidings (down)* .. .. | | 140·2 |
| Tibshelf Town .. .. .. .. | | 143·0 |
| Pilsley .. .. .. .. .. | | 144·4 |
| Heath .. .. .. .. | 146·8 | 146·8 |
| Grasmoor .. .. .. | 149·3 | |
| CHESTERFIELD .. .. | 151·9 | |
| Sheepbridge .. .. .. | 153·3 | |
| Staveley Works .. .. .. | 155·2 | |
| *Duckmanton South Junction (down)* .. | | 149·8 |
| Staveley Town .. .. .. | 156·8 | 152·7 |
| Eckington .. .. .. .. | | 154·7 |
| Killamarsh .. .. .. | 156·5 | 156·5 |
| Waleswood (Sheet 15) .. .. | 158·9 | |
| Beighton .. .. .. .. | | 158·5 |
| *Woodhouse East Junction (down)* .. | | 159·3 |
| Woodhouse .. .. .. .. | | 159·8 |
| Darnall .. .. .. .. | 162·7 | 162·7 |
| Attercliffe (Sheet 16) .. | 163·7 | |
| SHEFFIELD VICTORIA (To York, Sheet 16) .. .. .. .. | | 164·7 |
| Neepsend .. .. .. .. .. | | 165·9 |
| Wadsley Bridge .. .. .. | | 167·6 |
| Oughty Bridge .. .. .. .. | | 169·6 |
| Deepcar .. .. .. .. .. | | 172·6 |
| Wortley .. .. .. .. .. | | 173·5 |
| *Barnsley Junction (down)* .. .. | | 176·9 |
| PENISTONE .. .. .. .. | | 177·6 |
| *Thurlstone (up)* .. .. .. .. | | 178·9 |
| Hazlehead .. .. .. .. | | 181·4 |
| Dunford .. .. .. .. .. | | 183·6 |
| Woodhead .. .. .. .. | | 186·8 |
| Crowden .. .. .. .. .. | | 188·8 |
| *Torside Crossing (up)* .. .. .. | | 190·7 |
| Hadfield .. .. .. .. .. | | 193·3 |
| Dinting .. .. .. .. .. | | 194·1 |
| Mottram .. .. .. .. .. | | 196·2 |
| GODLEY JUNCTION (to Liverpool Sheet 15) .. .. .. .. | | 197·7 |
| Newton .. .. .. .. .. | | 198·6 |
| Hyde Junction (platforms, down side) | | 199·7 |
| GUIDE BRIDGE .. .. .. | | 201·0 |
| Fairfield .. .. .. .. | 202·3 | 202·3 |

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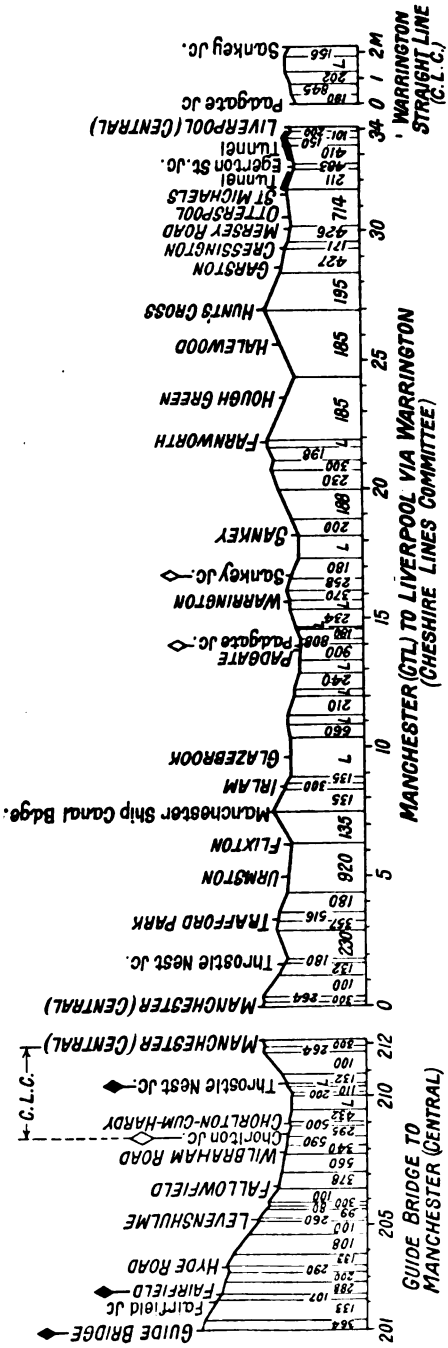


SHEET 16. GRADIENT PROFILES, LONDON & NORTH EASTERN AND C.L.C. RAILWAYS.

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| | Miles. | Miles. |
|---|---|---|
| Hyde Road | 203·4 | |
| Levenshulme | 205·2 | |
| Fallowfield | 206·5 | |
| Wilbraham Road | 207·9 | |
| Chorlton-cum-Hardy | 209·0 | |
| *Throstle Nest East Junction (down)* | 210·6 | |
| MANCHESTER (CENTRAL) | 212·1 | |
| Gorton | | 203·3 |
| Ashburys | | 204·5 |
| Ardwick | | 205·2 |
| MANCHESTER (LONDON ROAD) | | 206·0 |

**Manchester (Central) to Liverpool (Sheet 15) Cheshire Lines Committee).**

*Mile-posts, up (north) side, Manchester to Liverpool (zero), routed via Warrington Station.*

| | Miles. | Miles. |
|---|---|---|
| MANCHESTER (CENTRAL) | 0·0 | 0·0 |
| *Throstle Nest East Junction (up)* | 1·5 | 1·5 |
| Trafford Park | 3·2 | 3·2 |
| Urmston | 5·0 | 5·0 |
| Flixton | 6·2 | 6·2 |
| Irlam | 8·4 | 8·4 |
| GLAZEBROOK (from Godley Junction, Sheet 15) | 9·6 | 9·6 |
| Padgate | 13·9 | 13·9 |
| *Padgate Junction (up)* | 14·2 | 14·2 |
| WARRINGTON | 15·7 | Direct |
| *Sankey Junction (down)* | 16·8 | 16·5 |
| Sankey | 18·2 | 17·9 |
| *Widnes East Junction (down)* | 20·0 | 19·7 |
| Farnworth | 21·8 | 21·5 |
| Hough Green | 23·5 | 23·2 |
| Halewood | 25·6 | 25·3 |
| Hunt's Cross | 26·9 | 26·6 |
| GARSTON | 28·6 | 28·3 |
| Cressington | 29·3 | 29·0 |
| Mersey Road | 30·0 | 29·7 |
| Otterspool | 30·5 | 30·2 |
| St. Michael's | 31·4 | 31·1 |
| *Egerton Street Junction (down)* | 32·5 | 32·2 |
| LIVERPOOL (CENTRAL) | 34·0 | 33·7 |

**Godley Junction to Glazebrook (Sheet 15).**

*Mile-posts, up (north) side, Godley to Glazebrook (from zero at Liverpool).*

| | Miles. |
|---|---|
| GODLEY JUNCTION | 0·0 |
| Woodley | 2·5 |
| *Bredbury Junction (up)* | 3·6 |
| *Brinnington Junction (down)* | 4·8 |
| STOCKPORT | 5·5 |
| *Cheadle Junction (up)* | 7·3 |
| Cheadle | 8·1 |
| Northenden | 9·6 |
| Baguley | 11·9 |
| *Skelton Junction (down)* | 13·0 |
| West Timperley | 13·8 |
| Partington | 16·7 |
| Cadishead | 17·7 |
| GLAZEBROOK | 18·7 |

**Sheffield to Retford (Sheet 15).**

*Mile-posts, up side, Sheffield to Retford (from zero at Manchester).*

| | Miles. |
|---|---|
| SHEFFIELD (VICTORIA) | 0·0 |
| Darnall | 2·0 |
| Woodhouse | 4·9 |
| *Woodhouse East Junction (down)* | 5·4 |
| Waleswood† | 7·0 |
| Kiveton Park | 9·8 |
| Shireoaks | 12·9 |
| WORKSOP | 14·9 |
| Checker House | 18·9 |
| *Whisker Hill Junction (up)* | 22·1 |
| RETFORD | 22·6 |

† From Marylebone direct *via* Aylesbury and Killamarsh, 158·9 miles.

**Sheffield to York (Sheet 16).**

*Mile-posts, down side, Woodburn Junction (zero) to Swinton, up side, Dearne Junction to Moorthorpe (from zero St. Pancras, London); down side, Moorthorpe to Ferrybridge (from zero, Mexborough West Junction) down side, Ferrybridge to York, (zero).*

| | Miles. |
|---|---|
| SHEFFIELD (VICTORIA)* | 0·0 |
| *Woodburn Junction (down)** | 1·1 |
| Attercliffe (closed)‡ | 1·7 |
| Broughton Lane | 2·2 |
| Tinsley | 3·3 |
| ROTHERHAM | 5·6 |
| Rotherham Road | 6·6 |
| Parkgate and Aldwarke | 7·7 |
| Kilnhurst | 9·6 |
| Swinton | 10·9 |
| *Mexborough West Junction (down)* | 11·7 |
| *Dearne Junction (up)* | 12·6 |
| Bolton-on-Dearne | 13·3 |
| Frickley | 16·5 |
| Moorthorpe | 19·4 |
| Ackworth | 22·9 |
| PONTEFRACT | 25·6 |
| FERRYBRIDGE | 27·6 |
| Burton Salmon | 30·2 |
| Monk Fryston | 31·5 |
| Milford Junction (closed) | 32·2 |
| Sherburn-in-Elmet | 34·0 |
| CHURCH FENTON | 36·1 |
| Ulleskelf | 38·0 |
| Bolton Percy | 39·2 |
| Copmanthorpe | 43·1 |
| *Chaloner Whin Junction (up)* | 44·9 |
| YORK | 46·8 |

* Trains from Sheffield to York travel on the up road from Sheffield to Woodburn Junction.

‡ From Marylebone direct *via* Aylesbury and Darnall Curve, 163·7 miles to Attercliffe.

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# THE WHY AND THE WHEREFORE.

RAILWAY MAGAZINE *readers desiring information should mark envelopes "Query" in the upper left-hand corner, and address them to the Editor. Questions relating to the dimensions and weights of railway rolling-stock and to names, numbers, dates, &c., of locomotives should not be forwarded. No reader should send more than two questions in one month. Correspondents are requested to write on one side of the paper only, and although they must give their names and addresses, pen-names or initials may be inserted for Editorial use. Before asking for information concerning railway history or "grouping," the pages of the "Railway Year Book" (5s. net) should be consulted. The thirty-first Annual Edition* (1928) *of this standard railway reference work is now published. All previous Editions are out of print.*

### A Signalling Query.

"A and B are two adjacent signal boxes on the same line (double track). A has a train approaching his box and offers it to B. Bell signals are exchanged and B brings into use his key-disc and pegs 'Line Clear.' This is indicated simultaneously in A's keyless disc. A pulls off his signals, and when the train has passed them he signals B by bell and then pegs 'train entered section.' A replaces his signals, and awaits 'out of section' from B. I think this is the correct procedure, but the point I am doubtful of is:—When is B entitled to give A 'Line Clear'?" A signal engineer, taking into account further remarks in our correspondent's letter, thus replies:—"The standard block telegraph rule No. 4 provides that B must not consider the line as clear, nor must a train be allowed to approach from A, until the preceding train has passed a quarter-of-a-mile beyond his own home signal. That limit is often referred to as 'the clearing point,' but no such phase is used in the rules."

[Reply to G. N. MARTIN.]

### Speeds of Electric Trains, S.R.

Mr. R. G. Bolton writes: "The third rail direct current motors are, I believe, designed for a top speed of 54 m.p.h., and I should be very much interested to know whether you have any information regarding the highest speeds attained by this stock. For myself, I use the service running non-stop as between Norwood Junction and London Bridge, 8¼ miles in 13 min., and the highest speeds I have clocked with an 8-car train vary between 60-65 m.p.h. down Brockley Bank. Actually, I have ascended this incline at an average of 52 m.p.h. Leaving London Bridge by the 6.5 p.m., we quite frequently catch up the 6 p.m. London Bridge to Brighton express—usually at Forest Hill; providing we go unchecked, this train will not overtake us until after we leave Norwood Junction! A driver tells me he has attained 75 m.p.h. down Brockley Bank, but that seems to me to be a stretch of the imagination!"

[Further reply to G. M. BARRETT.]

### Continental Trains.

The 1.50 p.m. from Victoria is for Folkestone Junction, but the 2.3 p.m., if not itself divided, has one section for Dover and the other for Folkestone, with any traffic which cannot be taken by the 1.50 p.m., division being made at Folkestone Junction. The public time-tables do not show actual running times, which are varied according to the number of sections in which trains run and other considerations. Folkestone trains run to a siding just beyond the Junction and are worked between the reversing siding and Folkestone Harbour by the 0-6-0 tank engines used on the very steep Harbour branch. Four or five minutes are usually occupied in changing engines in the reversing siding.

[Reply to "SIR FRANCIS DRAKE."]



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**Llandilo-Carmarthen Line.**

" Just south of Llandilo station towards Carmarthen Valley Junction lies a section of ' single road ' that includes a bridge over River Towy, and the bridge is built for double load. Again, just north of Carmarthen G.W.R. station is a bridge over River Towy, only single road being available. Considering the large volume of mineral and passenger traffic through Llandilo and the complicated junctions around Carmarthen, is it not rather strange that these two sections, respectively, should have remained single for so long ? " We are advised officially that the bridge over the River Towy at Carmarthen will shortly be reconstructed as a double line structure, the contract for which will probably be placed in April or May next.

[Reply to " WEMBLEY."]

**Named Locomotives, S.R.**

Several classes of pre-grouping locomotives, notably the Brighton " Atlantics" and the Urie 4-6-0's of the " E736 " class, have been named, and we gather that names will be employed generally for new " express passenger " locomotives, such as the " Schools " class 4-4-0's, in the 1929 programme. It is not very probable, however, that older engines will be named beyond those already provided for. The " Lord Nelsons " may, in due course, be used elsewhere, but at present are kept almost entirely to Continental trains from Victoria.

[Reply to A. R. MORDAUNT.]

**G.W.R. 4-6-2, " The Great Bear."**

Mr. F. W. Brewer writes :—" Apart from the weight and length of this engine, which restricted its use to certain sections of the G.W.R., it is generally understood that the trouble experienced with the trailing axle—a radial one with inside bearings—was due to a tendency to run hot. The question as to whether the fitting of external bearings to this axle would necessarily have put matters right, cannot definitely be answered in the affirmative, as such an alteration was never carried out."

[Reply to WM. E. BRIGGS.]

**Siding Near Croydon, S.R.**

Mr. J. Pelham Maitland writes :— " This enquiry relates presumably to the line to Waddon Mills, which in my schooldays were owned and worked by Messrs. Chasemore, Brown & Co. It is about ¾-mile long, and is entered from the sidings at Waddon Marsh. It is, strictly speaking, a siding and nothing more, although the approach thereto is a lengthy one. It is, in this respect, out-distanced by the siding to the Gas Works and Ballast Hole at Eastbourne, which, I believe, is about 2½ miles in length."

[Further reply to P. S. EVETTS.]

**" King Arthur " Locomotives.**

Nos. E448-457 belong to the first series and presumably bear a closer resemblance in details, such as cab and cab roof, to Urie 4-6-0's Nos. E737-755. Later engines, such as Nos. E763-806, have, we assume, been given a modified and improved form. Differences of this kind are often to be observed among engines of various series but of the same general class.

[Reply to " CYTRINGAM."]

**Pullman Cars in Ireland.**

These convey first-, second- and third-class passengers. Irish ordinary fares are substantially on the same basis as in England, 2½d. per mile first-class, 2d. per mile second-class, and 1½d. per mile third-class, though the full mileage rate is not always charged. We have no Irish fare list available, but a mileage computation will give any particular fare on an approximate basis.

[Reply to ERIC G. BATES.]

**Rebuilt 0-6-0T Engines, S.R.**

Information as to matters of this kind is given in " Locomotive Matters," as far as particulars are available. We cannot, however, institute special enquiries as to do so would open the way to general requests of a similar character.

[Reply to C. H. SIMMONS.]

**Engines in Accidents.**

4-4-0 No. 704 was primarily concerned in the Charfield accident and compound 4-4-0 No. 1060 at Ashchurch.

[Reply to J. COLYER-FERGUSSON.]

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# Railway Bills in Parliament.

THE most noteworthy railway proposals for the 1928–29 Session of Parliament are, of course, those made by each of the four great companies for air transport powers. Next in importance are those connected with London traffic. Separate Bills are being promoted by the "Underground" companies and by the London County Council, in order to sanction agreements for the co-ordination of passenger traffic within the London Traffic area by means of common management of and a common fund for transport undertakings within that area. The terms in which the notices are framed are very wide, so as to include not only the undertakings of the two actual promoters, but also those of other local authorities and companies which may desire to be included. They may provide for the appointment of an advisory board consisting of representatives of the undertakings concerned and for the leasing of certain undertakings, and will provide for supervision of any agreement by the Minister of Transport.

An important scheme of development is foreshadowed by the Metropolitan Railway notice, the principal part of which provides for the widening of the railway from Wembley Park to a point north of Harrow station—a scheme entailing the laying down of over five miles of additional track and the remodelling of stations *en route*. This has been rendered necessary by the rapid growth of the residential districts served by the system. Additional accommodation at certain stations in the Inner London area, including Baker Street, Great Portland Street, Euston Square, King's Cross, Marlborough Road and Swiss Cottage, is also proposed to be given by the enlargement of tunnels and the lengthening of platforms.

Subways at Highgate, Tottenham Court Road, and Leicester Square, and a new booking hall at Leicester Square, are the new works proposed in the joint Bill of the London Electric, Metropolitan District, and City and South London Railway Companies.

The Southern Railway proposes to substitute a new connection between the South London and Crystal Palace lines near Rye Lane for one authorised in 1926, and to abandon so much of the Blackheath Hill and Greenwich Park line as is not required as part of new connections with the Tonbridge main line. Among the proposed works is a new road which should abolish the level crossing at Lyndhurst Road station over the main line between Southampton West and Bournemouth.

In the London Midland and Scottish notice there is a proposal for a deviation in Poplar of part of the electrified portion of the Whitechapel–Barking line, and for the alteration of levels of roads at certain points on the Tilbury section. Repeal is to be sought of Section 21 of the Midland Railway (London, Tilbury and Southend Railway Purchase) Act, 1912, which requires the company to submit to Parliament a scheme for electrification of the direct line between Fenchurch Street and Southend. In this connection may be mentioned the company's scheme for improvement of the London–Southend service by other means, such as the further utilisation of Broad Street, which will involve a large outlay, and may necessitate further Parliamentary powers.

Great Western Railway new works proposals include two short railways at Hayes (Middlesex) and a railway at Llantrisant connecting the "Barry" Treforest branch with the "Taff Vale" Llantrisant branch. It is also proposed to revive the powers for completion of certain railways authorised in 1911 to serve the district between Brynamman and Swansea, and to enable the Great Western and Great Central Joint Committee to construct a railway at Chepping Wycombe.

Each of the four companies is asking to extend the period of operation of its Increased Dock Charges Order of 1924. The L.M.S. and Southern Railways are asking power to make and enforce dock bye-laws and to raise additional capital, new money powers being also required by the Metropolitan Railway Company.

Air transport powers are being sought by the four principal British railway companies, as above mentioned.



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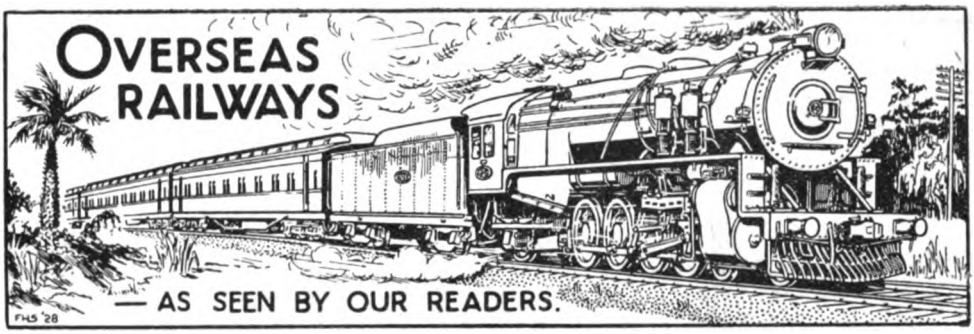


*Correspondence for this section, with or without photographs, is invited.*

**Notes on American Railways.**

BASED upon remarks published in the December number, Mr. Eric Crickmay sends the following comments in the way of correction and amplification :—

Boston to New York is 299·1 miles, and not 235 (" this city " must refer to Boston). The " Knickerbocker " is just as fast as the " Merchants Limited " (5 hr. 10 min.). The trains often exceed 60 m.p.h., nor is it a very badly curved route.

The " Knickerbocker " and " Merchants Limited " are both extra fare ($1·20) parlour car only trains. They are exactly equal in every respect.

Gauze screens are not provided in day coaches, so there is no point in Mr. Reeves' humour ! Porters open sleeping car, parlour car windows, &c., which are all provided with the screens. The " Wolverine " runs from Boston to *Chicago*—not Montreal.

There are *six* trains a day each way between Boston and Montreal. Names follow :—The " Alouette " and the " Red Wing," *via* C.P.R. ; the " Ambassador " and the " New Englander " *via* C.N.R. ; the " Mount Royal " and the " Green Mountain Flyer " *via* Rutland.

Boston to Portland is not " four hours by most trains." There are two trains in 2 hr. 20 min. and three trains in 2 hr. 30 min. Only *one* through train takes as much as four hours.

Referring to illustrations and records in recent issues, that on page 477 shows a C.N.R. locomotive. C.P.R. cars are built of wood or steel, and not iron. A day coach passenger from New York to Washington travels in a fine upholstered 60-ton steel coach on rails weighing over 100 lb. per yard, and not in a sort of " disused dining car." Single-bed cars are now in use on a number of routes, and will undoubtedly increase in number.

Following are some of the routes :—New York–Boston, New York–Washington, Chicago–St. Paul, Montreal–Quebec (C.P.R.), and Montreal–Toronto (C.P.R. and C.N.R.).

One and a quarter rail fares, plus two lower berth fares is the charge ; thus from New York to Boston, a single room would cost (229 miles), $17·85. They are better equipped than the English first-class rooms.

**Shortest Station Names and Notes on French Railways.**

WITH regard to the article on " Shortest Station Names " in the January issue, perhaps it would be of interest to add the following :—" Us," which is given as a station on the Est, is really on the État line from Dieppe to Paris (St. Lazare) *via* Pontoise. " Eu " is correctly given as on the Nord, but is also on the État from Dieppe to Le Trépat Meus. " Gy " should also be added ; it is on the small vicinal line from Gray (Est) to Grandvelle, also from Gy to Marnay (P.L.M.). In view of the interest taken in French railways, I venture to add the following remarks, sent to me by a French friend whom I questioned about latest developments :—" The P.L.M. have now in regular service about 50 Mountain (4-8-2) engines and some 40 more under construction. They are used on the Laroche-Dijon, Dijon-Vallorbe, and Marseille-Vintimille lines. They weigh some 112 tons without the tender, and, in my opinion, they are a perfect waste of money, for on this line (P.L.M.) the only severe gradient of the main (Paris-Marseille) line is between Les Laumes and Dijon. The trains are timed at such a very low speed between Paris and Dijon (315 km.), with one stop for changing engines at Laroche, that the large wheeled Pacifics in use on the line are only really strained with loads upwards of 500-550 metric tons, which are *not* the rule. In this case the Pacific could do Paris-Les Laumes (with a stop if necessary) at Laroche outwards or at Sens backwards,



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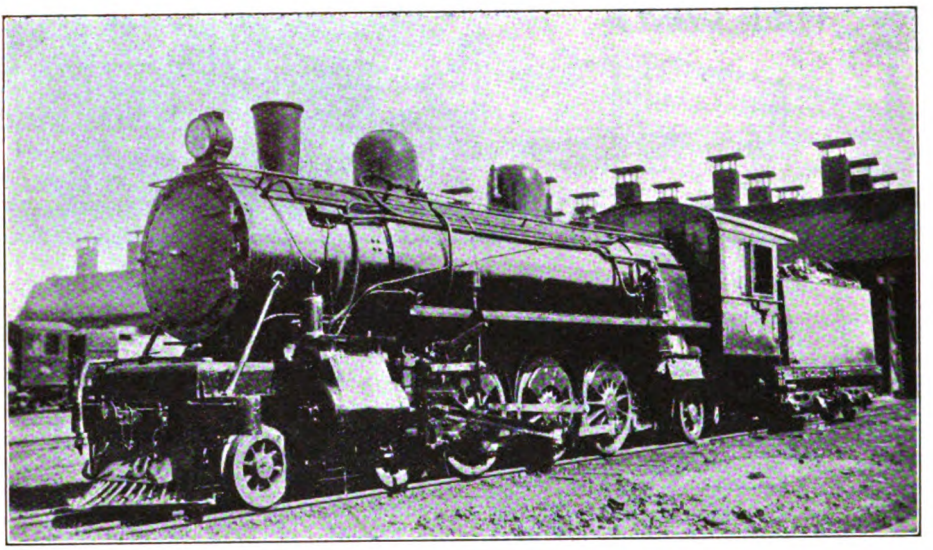

*Photo.*] [*W. W. Stewart.*

**BALDWIN 4-6-2 REBOILERED AND SUPERHEATED AT NEWMARKET SHOPS, NEW ZEALAND GOVERNMENT RAILWAY.**

*Photo.*] [*W. W. Stewart.*

**SCRAPPED LOCOMOTIVES DUMPED AT WESTFIELD, NEAR AUCKLAND.**

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and the "heavy loads on Les Laumes-Dijon section, with 80-100 gradients, could be done with a Mikado having 1·650 m. wheels against the 1·800 m. of the Mountain, which could easily maintain 70-75 Km. on the up grade and 90 Km. on level and down grades. Personally, I think the new Nord Pacifics do the most remarkable fast traffic work in the world."—[A. V. EBBLEWHITE.]

**Notes on New Zealand Railways.**

CLASS "Q 350" engines are being re-boilered and superheated at Newmarket shops. They were originally built at the Baldwin Locomotive Works in 1901, and were the first wide fire-box "Pacifics" in the world. There were 13 ordered, 10 going to the South Island and three to the North. Since 1925 some eighty engines have been scrapped. They have had all the fittings stripped, and they have been dumped, some as river stop banks and others used for reclaiming purposes. The photograph shows eleven dumped between a siding and the new main line at Westfalls. In this graveyard are some very historical old engines as far as New Zealand is concerned; for there are the old "K" class that came from Rogers, U.S.A., in 1878, the first "Baldwin" we had, 1878 Class "T," then some "Avon sides," a single "Fairlie" and a tank both of 1878, and two "Nasmyth Wilsons" of 1885.

New Zealand's first commerce train was organised by the Auckland Chamber of Commerce, in co-operation with the Department of Industries and the Commercial Branch of the New Zealand Railways. It toured the Auckland Province from October 26 to November 4, here were over 80 people on the train, including 58 business men, 14 Government officials and the railway staff. The nine days' itinerary called for 1,700 miles of travel—1,200 by rail and the balance by motor or launch. It covered visits to factories and farms, mines and scenic resorts. A daily newspaper was published on the train. I send (not used) a photo of the train leaving Auckland at 9 p.m. on October 26.—[W. W. STEWART.]

**Extra Fares on United States Railways.**

COMMENTING upon remarks made by Mr. W. Shirley, as published in the November number, Mr. K. A. Mering, writes from Baltimore, U.S.A., as follows:—

The tariff of the New York Central Railroad relative to extra fares on the "20th Century Limited" and other limited trains states:—

*Amounts Refunded.*—Where the extra fare trains shown herein are one hour or more late (reckoning from scheduled time of arrival) in reaching points to which extra fare has been collected under this tariff, refunds will be made on basis of one dollar and twenty cents ($1·20) for each hour such trains are late (not to exceed the total fare paid).

In making refunds under this rule, trains arriving fifty-five minutes late will be considered as one hour late; trains arriving one hour and fifty minutes late will be considered as two hours late; trains arriving two hours and fifty minutes late will be considered as three hours late, &c.

The above is taken from Rule 8, page 6 of N.Y.C. R.R. tariff No. 251, Sixth Issue. The extra fare tariff of the Pennsylvania Railroad carries the same refund provision in respect to the "Broadway Limited" and other limiteds. The extra fare in this instance is calculated on a basis of service from or through New York City to or through Chicago, of $1·20 per capita for each hour less than 28 hours, so that the extra fare on either the "Broadway Limited" or the "20th Century Limited," making the New York to Chicago run in 20 hours, is $9·60.

As refund must be made if the train is 55 min. late, irrespective of the reason therefor, it is obvious that both the Pennsylvania Railroad and the New York Central Railroad, from time to time do pay back these charges to "Broadway" and "Century" passengers. It is interesting to note that the method outlined above of computing and adjusting extra fares is not standard to all traffic routes. The Pennsylvania Railroad charges $1·00 extra fare for passage on the "Congressional Limited" between New York and Washington, while $5·00 is exacted on the "Crescent Limited" operating from New York to New Orleans, with no arrangement for adjustment on account of lateness by either train.

**Railway Travel in Canada.**

MR. R. S. RUSSELL, on page 480 of the December RAILWAY MAGAZINE, referring to travelling conditions in Canada and America, says "Single sleeping compartments seem to be unknown." He has evidently overlooked the recent introduction by both the Canadian National and Canadian Pacific Railways of cars which are a series of individual bedrooms, containing beds (real beds, not berths !), lavatory and washing accommodation. These cars are run on overnight routes (*e.g.*, Montreal-Toronto to Montreal-Quebec), but are not placed on longer runs, since they are not convertible for day purposes. It should also be said that what are technically known as "compartments," which are universal on the principal trains, contain two berths (convertible for day-time use). Exclusive use of a compartment in Canada can be secured in one railway fare, but in the United States two are required.

The standard Pullman sleeper contains

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*Photos.*] [*D. H. Stuart.*

**1. MANDALAY-RANGOON MAIL TRAIN.**
**2. 4-6-0 LOCOMOTIVE ON TRAIN.**
**3. GARRATT LOCOMOTIVE ON THE MANDALAY-LASHIO BRANCH.**

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upper and lower berths, and "drawing rooms" at the end, the latter having accommodation for three. This is an entirely different type of car from the ordinary day coach, which seats approximately 50 people. "Compartment" cars are usually entirely compartments or half compartments and the remainder "a club car," *i.e.*, a lounge car with an observation platform outside. Observation cars are always, of course, at the rear, except under conditions of special working.

One point which your various recent correspondents have not mentioned is that principal long-distance trains have to be completely turned round on arrival at terminals. Their normal make-up, from the engine, is luggage cars, day coaches (where these are carried), parlour and sleeping cars, observation car, with dining car somewhere in the middle.

With regard to colours (page 469), the Minneapolis, St. Paul and Sault Ste. Marie car colour is crimson lake, similar to the C.P.R. The Chicago, Milwaukee & St. Paul car colour is orange. An inter-urban electric road out of Montreal has changed from green to orange as a "safety-first" measure, the theory being that orange is more readily seen than green at level crossings, which are, of course, unprotected.

The illustration on page 477 is of a Canadian National engine, not Canadian Pacific. The hotel in the background is the Canadian Pacific's new Royal York Hotel, which, when completed, will be the largest hotel in the British Empire.

[A. H. ROWLAND.]

**The Burma Railways.**

THE main line of the Burma Railways is from Rangoon to Mandalay, about half of which is double track. Photo No. 1 shows the 2.0 p.m. Mandalay-Rangoon mail train approaching Mijitue, about 8 miles south of Mandalay. The engine is 4-6-0 No. 320. For local trains 4-6-0 goods engines are used almost universally and on the main line for goods traffic, although some of them have now been displaced by the new standard 2-8-2 engines.

Photo No. 3 shows the Mandalay-Lashio branch which pushes out some 180 miles north-eastwards, and has a heavy traffic for the Burma Corporation Mines. This is a hilly line and starts off with a ghat section from Sedaw to Maymyo. Maymyo is summit level and about 3,500 ft., this rise being attained in 30 miles, about 17 miles of which are at 1 in 25 gradient with four reversing stations and the remainder in easier grades of 1 in 40 and 1 in 120. This service is worked by Garratt's, 2-8-8-2 type, one of which is a compound. This photo shows the compound heading an up goods train leaving Sedaw.

I will take this opportunity of making a few remarks about some comments that appeared in the October Number: Pertinent Paragraphs *re* Deflecting Screens. I have no personal experience of wind deflectors. but anything that tends to make the smoke keep away from the cab is greatly to be encouraged. If Mr. Derens had been on a modern big-boilered engine at night with the smoke blinding down and pitch dark, and going at high speed, he would, maybe, change his opinion. How the driver sees anything is a mystery, presumably his sixth sense comes into play. And if anything goes wrong, it seems the arm chair critics have him up for manslaughter! With regard to locos. in other parts of the world, he does not seem to realise high speeds as known at home are not called for, and in hot countries the steam does not condense and, therefore, there is nothing to blow about.

[D. H. STUART.]

**Notes on German and Polish Railways.**

ON the occasion of a recent business visit to Warsaw, I travelled by way of the Hook, Hanover and Berlin. Having selected the night of the mid-November storm for my crossing, the arrival at the Hook was naturally late, and very bad weather conditions inland caused further loss of time, so that the arrival at Berlin (Schlesischer Bahnhof) was 1½ hours late, and I missed the night express to Warsaw by 5 minutes. Following a consultation with various railway officials of high rank—who were courteous and helpful in the extreme—I left Berlin by the night train to Riga, which deposited me at Thorn at 4.40 next morning. Although Thorn is a place of importance, it is far from being an international junction, such, for instance, as Basle, and it was a pleasant surprise to be able to breakfast in luxury and be shaved at the station hairdressing establishment at 5 o'clock on a Sunday morning. (A subsequent attempt to emulate these feats at a similar hour at a great London terminus was a complete failure.) Leaving Thorn at 7.50 a.m., I had the privilege of studying Polish scenery and railways for 6½ hours, from a train which stopped at every station on the 160-mile route, and which was crowded to excess long before it reached Warsaw. To the credit of the train, be it said that it arrived punctual to the second. The Central Station of Warsaw is an uninspiring structure, largely built of wood. However, a fine new station is about to be commenced, embracing connections with an underground

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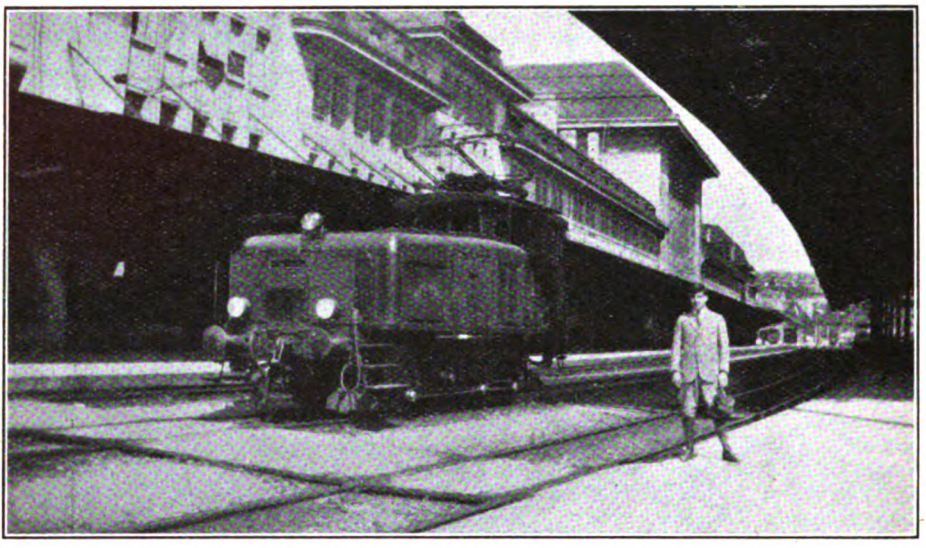

*Photo.*] [*H. Baud, Lausanne.*

**BROWN-BOVERI ELECTRIC LOCOMOTIVE AT LAUSANNE.**

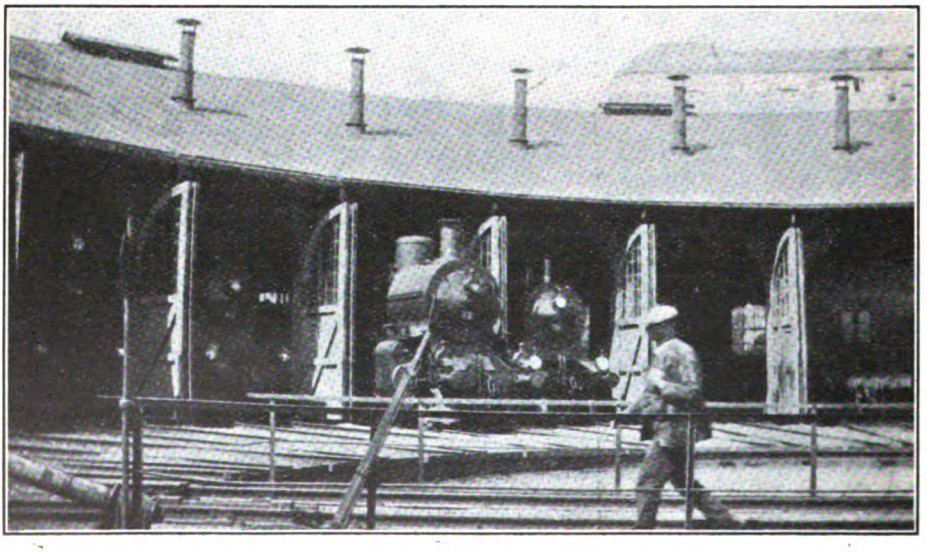

*Photo.*] [*H. Baud, Lausanne.*

**STEAM LOCOMOTIVES AT LAUSANNE ENGINE SHED.**

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railway which is now in course of construction.

Polish trains are comfortable, if not fast, and the permanent way (laid with F.B. rails) gives quite smooth riding. The international trains comprise stock of the conventional design, and include German, Polish, French and Belgian vehicles. Local trains are composed largely of ex-German stock, plus a number of new Polish coaches, painted olive green. Locomotives include ancient Polish outside-cylinder 4-4-0's, apparently of Russian design, and ex-German 4-6-0's, 0-8-0's, and tank engines of numerous types. The principal trains are hauled by enormous 4-6-2's of Polish design and construction, whose powers of acceleration with heavy loads are very striking. Light railways radiate from Warsaw in all directions, usually running alongside the main roads. They are of various gauges, and the trains are hauled by archaic locomotives, often with spark-arresting funnels of bizarre shapes.

I returned from Warsaw to Berlin by the Stolpce (Russian frontier)—Paris express, travelling in an International Sleeping Car Company's sleeper and breakfasting in a "Mitropa" restaurant car. Entering Germany 12 minutes late, the running was so consistently good that the arrival in Berlin was a minute before time. A German 4-6-2 was responsible for this good work.

Returning later from Berlin to Ostend, I travelled by "F.D.22"—a new express from Berlin to Cologne, composed of the latest corridor stock (first and second class) with a "Mitropa" restaurant car. A small supplement of 4 marks is charged, and is amply justified by the excellence of the accommodation. A feature of this, and of many other German expresses, is the provision of a female attendant, who sweeps the corridors, supplies clean towels, and makes herself generally useful. This train is booked from Berlin to Hanover (158 miles) in 3 hr. 7 min. Thence it takes the Ruhr route, calling at Essen, Duisburg and Dusseldorf. Owing to a violent gale, which often caused the train to rock perceptibly, we were very late into Cologne, but through no fault of the locomotives. The subsequent run *via* Brussels to the coast, in the teeth of a veritable hurricane, was too dismal to call for comment, while the crossing from Ostend to Dover is best left to the imagination of readers.

[MAURICE M. SMITH, A.M.I.A.E.]

**Notes on Swiss Railways.**

MONSIEUR O. GUIGER DE PRANGINO GERMAGNY sends the two photographs reproduced, taken on the Swiss Federal Railways, both at Lausanne. One shows an electric locomotive built by Brown, Boveri & Co., and the Winterthur Locomotive Works. This is used for shunting. The second photograph shown was taken at the Lausanne engine shed for steam locomotives. The photographs were actually taken by Monsieur Henri Baud.

**Sentinel-Cammell Cars in India.**

IN India, as in England, in some districts, the motor-'bus competes very keenly with the railway, though it is probably true to say that on the whole the motor-'bus as a feeder of the railway, has been a greater help than a hindrance. The railways are finding it necessary to meet the competition of the 'bus, especially in places where a good road runs parallel to the line, and especially where the road cuts off a corner.

The East Indian Railway is introducing Sentinel-Cammell cars in certain districts to provide a cheaper service, and in some places has arranged for special "halts" in addition to the stations. There is always a considerable number of litigants travelling to the courts held at the principal towns of each "district" or county. An inspection of the time-table generally shows that the trains are arranged so as to give a train in the morning in time for the opening of the courts, and one out in the evening to take people back.

The writer recently was at Akbarpur, a small town in the Fyzabad district of the United Provinces, and saw the arrangements made on the local branch line to Tanda, another town, some 11 miles distant. There are three trains on the branch. The morning one is still run by an engine, and is a "mixed" train, taking the local goods traffic, as well as passengers. The other two have been replaced by a Sentinel-Cammell car. This has the usual driver's compartment at each end, the engine being in the middle. There are four passenger compartments, a small first-class one, with a large third-class compartment behind it. Then comes the engine, and in the other coach a large third-class compartment, and a small third-class "zanana" or "ladies'" compartment at the far end from the first-class. The view on following page was taken at Akbarpur Junction, and shows passengers descending from a Sentinel-Cammell car. Owing to the place where the car draws up, it was impossible to obtain a photograph of the whole car.—[REV. W. MACHIN.]

**Rolling-Stock on German Railways.**

THE old passenger vehicles are of many different designs, as each of the seven State

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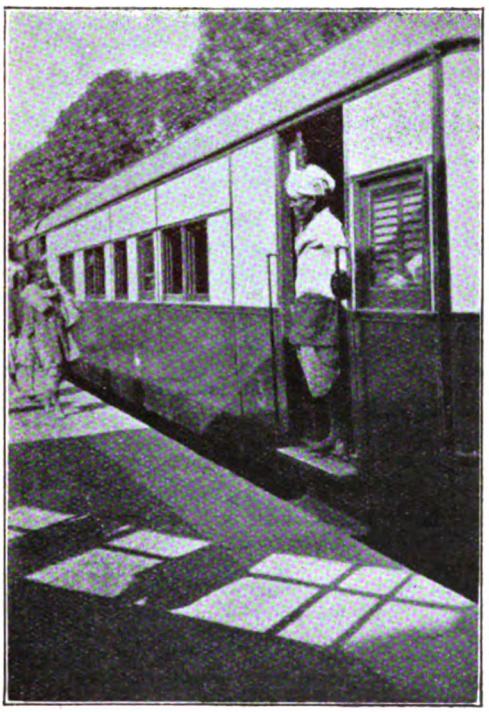

*Photo.*] [*Rev. W. Machin.*

**SENTINEL-CAMMELL RAIL CAR IN INDIA.**

railways existing before 1920 had its own patterns. New vehicles for main-line service are now carried almost exclusively on four-wheeled bogies, coaches with six-wheeled bogies no longer being built. Four-wheeled bogies are found to run point smoothly on modern track, including that laid with rails 98 ft. 5 in. in length on many main routes. The principal classes of main-line vehicles now in use are the following :—

1. First and second class with and without kitchen, and weighing about 52 tons each. These are the longest passenger cars in Germany, the length over buffers being 77 ft. 1 in.

2. Ordinary main-line vehicles for one or two classes and with separate compartments. Doors are at the ends. The weight is about 43 tons and length over buffers 71 ft. 2 in. Usually there are eight compartments, seating 48 second-class passengers, or 10 compartments seating 80 third-class passengers.

For local traffic four-wheeled vehicles are still largely employed, including many built since the war. New central corridor eight-wheelers are being constructed. These vehicles are for second and third-class passengers; the compartments have side doors. In some cases there are open platforms and gangways for intercommunication. One design accommodates 40 second or 58 third-class passengers, though some of the old former fourth-class vehicles will seat 66 passengers.

The length over buffers of all new four-wheelers is 45 ft. 8 in., their weight being from 17 to 21 tons. Most of the sleeping and dining cars are owned by the Mitropa company; they are now all painted in a dark red colour with golden stripes, all passenger cars of the Reichsbahn being painted in a dark green colour, except only the violet and white Pullman cars. Most of the passenger train vans contain a compartment for the chief guard. The mail vans are owned by the Reichspost.

A special feature of the German goods wagons is the designation of all types by letters and by names of German cities, which have here no geographical meaning. There are many kinds of wagons of the former State railways and of their "goods-wagons associations"; new Reichsbahn wagons are now of the following types :—

G. Kassel or München (Munich) : covered wagons.
Gl. Dresden : covered wagons for bulky goods.
K. Elberfeld : covered lime wagons.
V. Altona : small cattle trucks.
O. Halle : open wagons, tonnage 15 tons.
Om. Königsberg : open wagons, tonnage 20 tons.
R. Stuttgart : wagons with stakes.
Sm. Augsburg : platform wagons (rail-wagons).
SS. Köln (Cologne) : eight-wheeled platform wagons.
H. Regensburg (Ratisbon) : lorry trucks.

In addition to these, and many other capital letters, small letters indicate other features, as the tonnage, which is at least 10 tons, commonly 15 or 20 tons, and 59 tons (*i.e.*, 60 metrical tons) for eight-wheeled self-discharging wagons, which are equipped with automatic coupling. All other goods wagons have, like the passenger cars, a double screw coupling. Nearly all goods-wagons are equipped with the Kunze-Knorr compressed-air brake, or at least with brake pipe. Wagons which are not owned by the Reichsbahn are very seldom seen; most of them are white-painted beer or fruit wagons of great breweries and import houses, and tank wagons of chemical works.

[FRIEDRICH GRUNWALD.]

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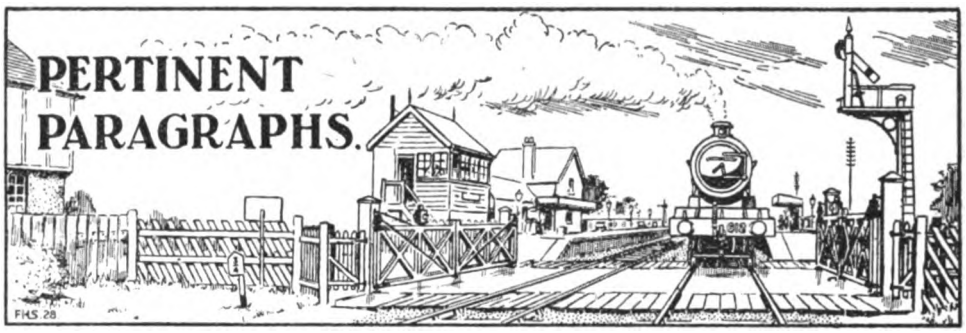


## G.W.R. Meeting.

In his masterly review of the past year's operations of the Great Western Railway Company, of which he is chairman, Viscount Churchill, at the annual meeting, reported a loss of £1,551,468, most of which, he said, could be identified with business in the South Wales area. It was some consolation to know that, on the other parts of the system, traffics were fairly well maintained, and that if the outlook in South Wales, which he was glad to say was now brighter, continued to improve, he hoped to place better results before the proprietors in twelve months' time. Shareholders, of course, were not surprised to learn that the reduction of the dividend was entirely due to abnormal conditions, and that the financial results would have been even more unfavourable but for the efforts of all grades to meet the position, evidenced particularly by the voluntary arrangement agreed to in August last, under which 2½ per cent. of payments for directors' fees, salaries and wages was surrendered by all concerned. After detailing how the company had been affected by the depression in the iron and steel industries and how they were prejudiced through local taxation payments, Lord Churchill predicted that great benefits would follow the road powers recently granted to the companies, because wasteful competition would be avoided, and the whole of the transport services, both rail and road, in the area served by the Western National Omnibus Company, could now be co-ordinated. We note with interest that Lord Churchill deprecated the idea of quoting railway ordinary stocks in £1 units and publishing net revenue receipts. In dealing with the Bill designed to give the company additional powers with regard to hotels, he took the view that there were quite a number of districts on the G.W.R. system which would attract more visitors if adequate hotel accommodation were available.

## The Metropolitan Meeting.

Having regard to the difficult year which the Metropolitan Railway Company has had to face, in common with other industrial concerns, through the continued depression in trade and the consequent limited spending capacity of the public, Lord Aberconway's view that the results may be regarded as satisfactory will, we think, be heartily endorsed by the shareholders and railwaymen generally. As his lordship stressed at the annual general meeting, in comparison with the trunk lines his company's increase in receipts was exceptional, and in comparing their position with that of the "Underground" group, it must be remembered that the "Met" have not, as they have, the revenue from a vast fleet of motor omnibuses to call in aid; on the contrary, the buses are the "Met.'s" chief competitors for short-distance traffic. Another important factor in connection with this line is that the ratio of railway working expenditure to railway receipts is an exceedingly low one, *i.e.*, 68½ per cent.—the truest test, as Lord Aberconway proudly submitted, of economical and successful administration. So, perhaps, all things considered, it is not so very surprising that the dividend should have risen to 3½ per cent. for the year, as against 3 per cent. in 1927. Lord Aberconway's "story" was one of steady progress; and it is interesting to note that as regards the coming year and the future of the company generally, he thinks there is every reason to "look forward with confidence."

## The L.M.S. Meeting.

Sir Josiah Stamp is nothing if not thorough, and in his remarkably comprehensive survey of last year's operations of the London Midland & Scottish Railway Company, at the recent annual meeting, he may be said to have covered the ground in a way calculated to satisfy the most exacting shareholder. From the text of his address, which has been fully reported in the press, it will be gathered that there was no mincing of words so far as concerns the losses in traffic receipts for the year. These were admittedly "extremely severe," and the reasons therefor are



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declared to have been due to (1) industrial depression; (2) road competition; and (3) reduced fares to conserve traffic against further losses to the roads. As evidence that it was not for the most part road competition which had brought about the decrease, Sir Josiah Stamp pointed out that the railway's diminution in total tonnage carried was 9,500,000 tons, and in the heavy classes of traffic which are seldom dealt with on the roads, about 9,000,000 tons. Dealing with the saving of £2,511,517 in railway expenditure, he explained that it was due to the lower prices of materials, and by actual economies in working, "which are the fruition of the effects of amalgamation and the special efforts which have been made by the officers to consolidate the undertaking." The speaker also had something very definite and encouraging to say as to the value of staff co-operation and the efforts which had been made to consolidate their organisation and effect improvements in rolling-stock equipment and accommodation for dealing with traffic. "Given an increase in trade," he said, "we are fully prepared for successfully dealing with a greater volume of business."

### The Southern Railway Meeting.

How, in the teeth of a most difficult year, the directors of the Southern Railway Company were able to turn a decrease of £556,000 into a net increase of £207,000 was explained recently at the annual meeting by the Chairman, Brig.-Gen. the Hon. Everard Baring. In a speech teeming with interest, he said the result had been achieved partly through the decreased price they had had to pay for coal, by a reduction of £112,000 under the heading of rates and taxes, by the agreement arrived at with the railway trades unions in July last, under which a reduction of 2½ per cent. had been made from all salaries and wages—which accounted for about £108,000—and, lastly, the considerable economies which had been effected in nearly every department and which the board hoped would be of a permanent nature. The economies were the result of hard work by the officers during the last four or five years in bringing about standardisation of equipment and concentration of work and savings in other directions, and he thought shareholders would all agree that they were to be heartily congratulated upon the result attained. Among other matters, Brig.-Gen. Baring made it clear that the company would only agree to the proposed removal of Charing Cross station to the south side of the river provided that the conditions, which he detailed, were fully complied with and the company compensated and indemnified in every respect. His remarks on the Channel Tunnel scheme were also very much to the point. So far as the company was concerned, it was a matter which would have to be submitted to the most searching examination.

### The L.N.E.R. Meeting.

Some criticism followed the address of the Chairman of the London & North Eastern Railway Company at the annual meeting on Friday, March 8. But Mr. William Whitelaw's replies thereto were so pertinent and convincing that we are not surprised to learn that the shareholders present turned down amendments respecting the non-acceptance of the accounts and the appointment of a committee of inquiry to consider the fees and duties of the directors and management. Mr. Whitelaw's speech was full of encouraging features. There was, for example, the statement that expenditure showed a total reduction of £2,779,700—equivalent to approximately 6 per cent. on the 1927 expenditure. There were references to: The many new methods which had been introduced in regard to the conduct of both passenger and merchandise traffic—among them being the development of the container system and the establishment of railhead depots; the utilisation of road traffic under the new Parliamentary powers; the satisfactory expansion of the company's Continental traffic; the great progress which had been made in the application of science to signalling, whereby they were enabled to dispense with a large number of signal cabins; and the use of larger and more powerful engines. It was also stressed that in the permanent way department very great advance had been recently made, and there was a special reference to the Froelich rail brake system which had just been introduced in the company's new concentration yard at March. All of which, it was rightly urged, should help shareholders to realise that their directors and officers, whatever their failings, had been at least alive to the need of being up to date in the organisation and management of the company's affairs.

### The Froelich Hydraulic Wagon Brake at March Concentration Yard.

On Monday, March 11, Mr. H. N. Gresley, Chief Mechanical Engineer, L.N.E.R., read a paper to the Institute of Transport on this subject, giving diagrams showing the layout contemplated if the ordinary ladder system had been adopted for comparison with that which had been in use during the last six weeks or so in conjunction with an installation of Froelich "retarders."

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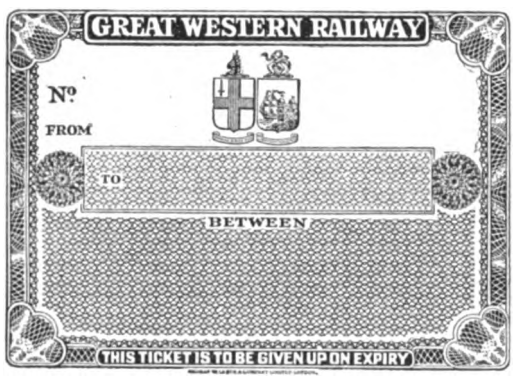
**New Type of Season Ticket, G.W.R.**

THE Great Western Railway is introducing an innovation which we feel will be a matter of very considerable interest to all season-ticket holders—that is to say, the application of a banknote process of printing to this class of ticket. In doing so, the company have been actuated by two motives: (1) to safeguard themselves and the public by making the ticket as proof against forgery as human ingenuity can effect; and (2) to produce a ticket of artistic merit of which the company can justly be proud.

The process employed is steel-plate printing, and is one of which very little use has




been made in this country prior to the issue of the new Bank of England notes. The work is engraved on a steel plate by the same method employed by the old masters of the art of steel engraving, but whereas each impression took the draughtsman of old many minutes to produce, powerful machinery now prints many thousands of impressions in an hour.

The delicacy of the engraving will be particularly noticed in the crest of the company, which appears under the title, and to those to whom the niceties of printing appeal, we are confident that the ticket will prove of considerable interest. The work is being carried out by Messrs. T. de la Rue, the well-known engravers and printers.

**Ultra-High-Pressure Locomotive for L.M.S. Railway.**

THE L.M.S. Railway announces that orders have been given for the building of a new express locomotive of the "Royal Scot" class, the special feature of which is the use of steam at the extraordinarily high pressure of 900 lb. per sq. in. The highest boiler-working pressure previously used on English locomotives is 250 lb. per sq. in. In this design, the high steam pressure of 900 lb. is raised in a drum separated from the normal boiler by the passage of very hot steam through tubes which are fitted in the high-pressure drum. The steam within the tubes is generated in a water-tube firebox, and this steam is used in the high-pressure cylinder at about 900 lb. per sq. in. pressure. The exhaust from this cylinder is then mixed with the steam from the low-pressure boiler and passes on to the low-pressure cylinders, which work at 250 lb. per sq. in.

This engine is of the three-cylinder compound type, and will be built by the North British Locomotive Company under the supervision of Sir Henry Fowler, the Chief Mechanical Engineer of the L.M.S. Railway, and the Superheater Co. Ltd., of London. The latter company is responsible for the general design covering the high-pressure boiler and certain modifications required to the inside high-pressure cylinder. The engine, when completed, will be submitted to a series of tests under service conditions.

**Japanese Permanent Way.**

A VERY instructive paper was read recently by Mr. T. Nagata, of the London Office of the Japanese Ministry of Railways, before the Permanent Way Institution. Japanese permanent way engineers have evidently to contend with many difficulties. The lines were originally constructed to many varying standards by engineers of different nationalities (the first being British), the gauge is only 3 ft. 6 in., and there are many sharp curves and steep gradients. Nevertheless, great progress has been and is being made, uniformity is being gradually secured, and many improvements have been effected. Owing to topographical and climatic conditions and the nature of the track, breakage and corrosion of rails are exceptionally heavy. Heavier rails are being introduced to meet rapid traffic developments, and experiments are being made with sorbitic and other special alloy steels, as well as with steel sleepers. In Hokkaido, the northern island, great trouble is experienced with the periodic warping of the track, owing to severe climatic conditions, but this is being steadily reduced. Snow, floods and avalanches are great enemies, and many special measures have to be adopted to cope with them. The most formidable difficulty, however, is, of course, that caused by earthquakes; and considering all the conditions, readers of Mr. Nagata's paper will, we think, agree that Japanese railwaymen have proved themselves a plucky and resourceful body, with a record so far which is creditable both to their skill and their ability.

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### The Charfield Accident Report.

ALL the proceedings arising out of the serious collision of October 13 at Charfield have been so fully reported that there is little for us to recite as to the facts now that Colonel Sir John Pringle's report thereon has appeared. It may be noted that the Ministry of Transport inquiry occupied two days at Gloucester and one at Birmingham; the main inquest took two days and the police-court proceedings also filled two days. Sir John Pringle has, therefore, little that is new to tell us, and we may almost go as far as to say that his conclusions and recommendations have been anticipated. As to the cause, it is shown that the distant signal was giving a good red light when the Great Western freight train passed it at 5.10, and it is Sir John's opinion that that indication continued to be displayed until the collision occurred at 5.20. It is admitted that foggy conditions prevailed, but, as regards the necessity for fog-signalmen, it may be remarked that the signalman at Charfield could see his "fogging object" and therefore, under the rules—which, it is observed, "are in accord with approved practice"—there was no necessity to send for the fogmen. Outside the station, both north and south, conditions were possibly worse, but that fact does not affect the question, as the enginemen of the mail said they saw the distant signal. The fireman claimed that he saw the signal at a distance of about three engine lengths—60 yards—and that it was showing a full green light. The driver, who drove from the right, said that approaching Charfield he moved over to the left-hand side of the footplate in order to get a better view of the signals as they are on the left side of the line. He stood behind his fireman, with his head over the side of the engine, and when he was about 12 wagon lengths, *i.e.*, 75 yards, from the distant signal he saw easily enough that it was showing a green light. Continuing his evidence, the driver said that he "moved back to the right side of the engine, after passing the distant signal, and looked through the front glass but failed to see either the outer or the inner home signals because the line was in a cutting and the atmosphere more dense. The man's failure to work to standard rule No. 143, as to action to be taken when signals are not seen, is excused because "It is not an infrequent, and indeed is sometimes an accepted, practice for drivers of trains when they are assured that the distant signal is "clear" to assume, when it is not possible to see them, that the signals in advance, the levers for which precede the distant signal, will also be in that position."

### Automatic Train Control.

So much for the cause; now for the recommendations. As it undoubtedly would have prevented the collision and all its terrible consequences, it is necessary that automatic train control should first be mentioned. As to that, Sir John Pringle observes that it alone can prevent the occurrence of accidents due to misreading of signals or to failures of enginemen to observe and obey signals and that a committee on the subject is now sitting. It is of interest to note that, when discussing the prevention of telescoping and the use of all-steel coaching stock, it is remarked that if means were adopted for preventing accidents which are caused by failure of engine drivers to observe signals or obey regulations, expenditure in such directions would be less necessary. In this case a method of automatic train control, providing either an unmistakable warning device on the engine, which, as is in use on some sections of the Great Western Railway, would have operated at the distant signal, or a full brake control at the outer home signal, would have prevented the collision. We make that quotation because of its acknowledgment that a warning, *i.e.*, a cab signal indication, at the distant would have been sufficient, as when the subject of A.T.C. was under discussion some seven or eight years ago one school of thought—mostly the older men—pinned their faith to an indication at the distant whilst the other school wanted full control at stop signals.

### Electric and Gas Train Lighting.

ON the subject of illumination of trains, it was a foregone conclusion that Sir John would again urge strongly the desirability of using electricity instead of gas as an illuminant. There was serious telescoping, due, in part, to the lack of shock-absorbing buffers and to the comparative weakness in construction of the leading vehicles. It is possible, however, judging from the result of "a recent collision at high speed"—obviously Dinwoodie, to which may also now be added Ashchurch, as there were two all-steel vans in that case—that, with vans of the company's all-steel type of construction at the head of the train, and with closer coupled passenger vehicles fitted with shock-absorbing buffers, the forces due to momentum would have been absorbed with less serious telescoping, and damage to gas cylinders and consequent issue of gas therefrom prevented. It is, therefore, recommended that, in order to reduce liability to telescoping, as the result of accident, (*a*) the number of all-steel vans should be enlarged sufficiently to provide eventually one or

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more of this class and type of vehicle at the front and rear of all express and important passenger trains ; (*b*) shock-absorbing buffers or collision fenders should be fitted as early as practicable to all coaching stock intended for such services ; (*c*) special attention should be given to marshalling of trains, so that the vehicles of older age or less strength, or those unfitted with devices named under (*b*), should be, whenever possible, placed in the centre.

### Train Lighting Statistics.

AMONG various appendices published with the Ministry of Transport report on the Charfield accident is a table showing " the numbers of gas, electrically and oil-lighted steam-worked coaching stock " owned by British railways on November 1, 1928. Particulars for the four big companies may be shown thus :—

| | Gas. | Electric. | Oil. | Total. |
|---|---|---|---|---|
| G.W.R. .. | 6,207 | 2,431 | 588 | 9,226 |
| L.M.S.R. .. | 11,874 | 10,931 | 720 | 23,525 |
| L.N.E.R. .. | 9,041 | 5,839 | 1,938 | 16,818 |
| S.R. .. | 2,298 | 4,060 | 1,173 | 7,531 |

On first inspection it may appear that the figures for gas and oil are unduly high. It has to be remembered, however, that substantial proportions under both headings must be older vehicles, many of which are not regularly used, as they are kept in service largely because of their usefulness to meet demands at holiday times and in the summer, or are found on country branch lines, while a further substantial proportion will, no doubt, consist of vans of various kinds which rank as coaching vehicles but do not convey passengers. On the other hand, though there are also vans among the electrically-lit vehicles, the percentage in everyday service on main line and more important traffic must be very much greater than the figures given suggest. These views are especially supported by the fact that so many oil-lighted vehicles are shown. The table also gives particulars in regard to the following other lines : M. and G.N. Joint, 204 gas ; Somerset and Dorset Joint, 111 gas and 6 electric ; and Cheshire Lines Committee, 271 gas and 188 electric. It has to be remembered that trains on these systems often include vehicles belonging to the owning companies. The Metropolitan has all its 96 steam-stock vehicles electrically lit. For electric stock, which is, of course, entirely electrically lit, the figures are : G.W.R., 60 ; L.M.S.R., 702 ; L.N.E.R., 142 ; S.R., 1,650 ; Metropolitan, 645. To these might be added the Metropolitan District, Mersey, Liverpool Overhead, and tube railways entirely worked electrically.

### The Glasgow (Queen Street) Glasgow.

COLONEL A. C. TRENCH'S report on this accident, which occurred on October 12 last, has been issued. A relief Edinburgh portion of the 9.45 p.m. express, consisting of five bogie coaches drawn by 4-4-0 engine No. 6382 was run into in the tunnel by an empty train worked by 4-4-0 engine No. 3060, which was being shunted from the station. One passenger was killed and two others sustained severe injuries and died in hospital. Fifty-two suffered from injuries and shock, of whom 15 had to be detained in hospital. The inspecting officer considers three circumstances which contributed to this regrettable accident :—(*a*) failure of sanding apparatus of engine No. 6382 ; (*b*) failure of driver Stirling to realise that he was slipping back ; and (*c*) improper action of signalman Gray in allowing the Alloa train to move forward before the Edinburgh train had cleared the tunnel. These are discussed in detail. No blame is attributed to the driver or to the Edinburgh running shed staff for failing to detect the imminence of failure of the sanding apparatus, while no serious blame is attributed to the driver for not realising that he was slipping back on the very steep gradient, as to which unusual greasiness was recognised as probable. Principal responsibility is therefore placed upon the signalman in regard to his action in dealing with the shunting train, in that he nullified a special arrangement designed to provide an additional safeguard in an emergency such as arose in this case. His explanation of the lapse, *i.e.*, anxiety to facilitate traffic, is, however, recognised as a genuine one. The inspecting officer recommends that the company should reconsider the permissible unassisted loading for various classes of engine, with a view to their reduction, as in this case it is evident that the permissible load was very close to the maximum capacity of the engine, and after one sander had failed the load was beyond this capacity. An improvement of the system of lights in the tunnel is advocated, including clusters of two or three high candle power lamps. It is also suggested that guards of unassisted trains should be required to be on the look-out and prepared to apply the brake until clear of the upper end of the tunnel. Remarks are also passed as to the examination of sander castings.

### L.N.E.R. Rail Carriage Design.

THE London and North Eastern Railway offers a first prize of £25 and a second prize of £15 for the design of (a) a first-class, or (*b*) a third-class railway passenger compartment, through the competition of industrial

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designs organised by the Royal Society of Arts, and to be concluded at the Imperial Institute in June next. It is the desire of the L.N.E.R. to create an impression of as much height in their compartments as possible, and a scheme where economy of production, whilst not being the first consideration, has not been ignored, will receive attention. Colouring should be briefly described, and ledges likely to collect dust should be avoided. Doors and windows must harmonise with the general scheme of decoration, and, among other things, it is suggested that, for the use of lady travellers, one small mirror should be shown somewhere in the scheme at a convenient height. Competitors should note that suggestions for improvement in the design and upholstery of seats are welcomed, "but they should comfortably accommodate three passengers each side with arm-rests in the first-class carriage, and four persons each side in the third-class compartment. Suitable coverings can be suggested. Electric lighting up to four 16-candle-power lamps or their equivalent should be included, and if so desired, the half ellipse which reflects the construction of the roof of the carriage internally on the door end of the side elevation can, in the interests of symmetry, be eased down on the corridor side to correspond with it."

### T.O.T. Philharmonic Society in "The Gondoliers."

SOME five or six years having elapsed since their first notable presentation of "The Gondoliers," the T.O.T. Philharmonic Society revived that masterpiece of mirth and melody recently at the New Scala Theatre, off Tottenham Court Road—having since they first started operations in 1921 produced nearly the whole of the Gilbert and Sullivan operas. Five performances were given, and it is pleasant to be able to place on record that the Society once again acquitted themselves well—so much so, indeed, that cordial congratulations are hereby tendered to the talented twain responsible for the production, viz., Mr. Emil Hardy, the stage manager, and Mr. Charles Lambert, the musical director.

Mr. Cyril Corker, as the Duke of Plaza-Toro, repeated his success of 1923; and Mr. Donald Munro put in some neat and amusing work as the Grand Inquisitor. The gondoliers—Marco and Giuseppi—were very brightly played by Mr. Leslie Woollett and Mr. James Lewis respectively. Mr. Ernest Wadey as Luis, Mr. Thomas Dean as Antonio, Mr. Reginald Duthoit as Francesco, Mr. Ralph Harlow as Giorgio, and Mr. Cecil Painton as Annibale did well in their several rôles. Miss Margaret Murdoch made an admirable Duchess and Miss Victoire Bryant

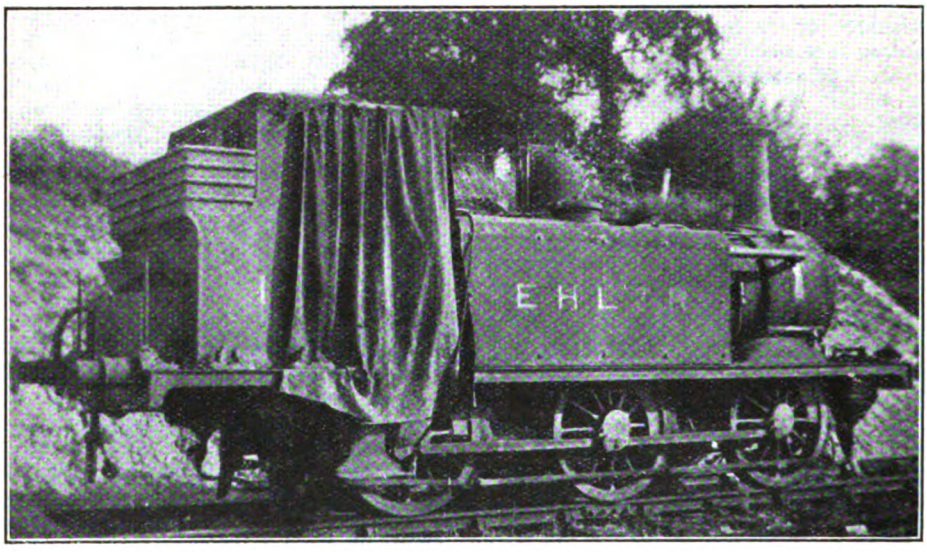

*Photo.*] [*R. A. Abbott.*

"STROUDLEY" 0-6-0T ON THE EDGE HILL LIGHT RAILWAY.

(*See references in previous issues.*)

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a no less acceptable Casilda. Giannetta and Tessa, the leading contadine, were capably and pleasingly played by Miss Doreen Howard and Miss Eleanor Esquilant respectively. Sound support was also forthcoming from Miss Minna Grist as Fiametta, Miss Nan Lloyd as Vittoria, Miss Mary Meade as Giulia, and Miss Roberta Labrom as Inez, the king's foster-mother.

The opera was beautifully staged and dressed, and a special word of praise must be accorded the members of the T.O.T. Orchestra. The Society's next production, we understand, will be " The Arcadians."

**Slotted Signals.**

" C. O." WRITES :—

" With reference to the old signal mentioned in ' Pertinent Paragraphs ' in the January issue, the description of the signal by your correspondent ' G. O. H.' is correct, but his statement that it is the distant signal for Middlewood is incorrect. It is the distant for a level crossing known as Norbury Hall Crossing, a road running through the woods. Its normal position is ' off,' and it is only put at ' danger ' when the crossing is open to road traffic. I was informed by the gateman that it is to be taken down shortly and another one put up in its stead about 100 yards farther away from the corresponding ' home ' signal which is, of course, by the crossing. The new one will, needless to say, be of the present modern type, so if any of your readers wish to have a view of what is probably the last of its type anywhere round Manchester they had better go in good time before it is removed. There was a similar type of signal, acting as ' up distant ' for Bramhall station, which was removed about three or four years ago. Bramhall is on the old L. & N.W.R. between Stockport and Macclesfield."

**The Garratt Locomotive.**

THE Garratt locomotive is to be regarded as an essentially British development and nowadays as amongst the most successful and progressive articulated locomotive types. Without reflecting upon the efforts of engineers abroad in connection with the design and construction of this class of locomotive, there certainly does remain the fact that to a prominent firm of locomotive builders in this country belongs the credit for advancing Garratt locomotive design to the high state of efficiency now reached. It is therefore not too much to say that, having specialised first as originators and afterwards for so many years as designers and builders of articulated engines on the Garratt principle for all gauges and purposes, those responsible for the evolution of what is now referred to as the " Beyer-Garratt " locomotive have established an unassailably pre-eminent position in this connection—the outcome of accumulated experience and knowledge for which there is no parallel elsewhere. There are numerous problems associated with the design and building of a Garratt locomotive which do not arise in ordinary locomotive practice. Many of these problems occasioned considerable trouble and anxiety in the past, but by the aid of the experience gained, intimate knowledge of requirements, and first-hand acquaintance with the behaviour of the engines under a variety of complex conditions, they have now been entirely solved. Thus it may be claimed with truth that the Garratt engine in its best and most reliable form is to be regarded primarily as a British product adaptable with safety and profit to every kind of railway traffic in all parts of the world.

**An American Locomotive Record.**

ANOTHER record has been created in America where the building of locomotives of extreme size and power is concerned, by the construction of a 2-8-8-4 Mallet engine claimed to be the largest and most powerful ever built. Space does not allow of a detailed description and illustration of this engine, but some idea of its proportions may be gathered from the fact that the boiler alone measures approximately 64 ft. in length, and weighs 73¾ tons. The total weight of engine and tender in working order is 498¼ tons, and, together with the booster engine, a combined tractive force of 153,300 lb. is developed. The engine is constructed on the single-expansion principle, with cylinders 26 in. diameter by 32 in. stroke, and has a length overall of 124 ft. 11⅛ in. The boiler is said to be the largest steam generator ever placed on locomotive frames, and its construction involved the drilling of more than 20,000 holes. It is, as a matter of course, mechanically fired, and some special features of equipment have been employed. The engine is regarded at present as an experimental one, and has been introduced to take over the work of two booster equipped Mikado (2-8-2) locomotives working over a very difficult 216-mile stretch, which involves numerous heavy grades. The Mikado locomotives each developed with booster a tractive effort of 63,000 lb. and were capable of handling individually loads of 2,225 tons, whereas the new 2-8-8-4 articulated locomotive is designed to take through the division a 4,000-ton train in either direction.

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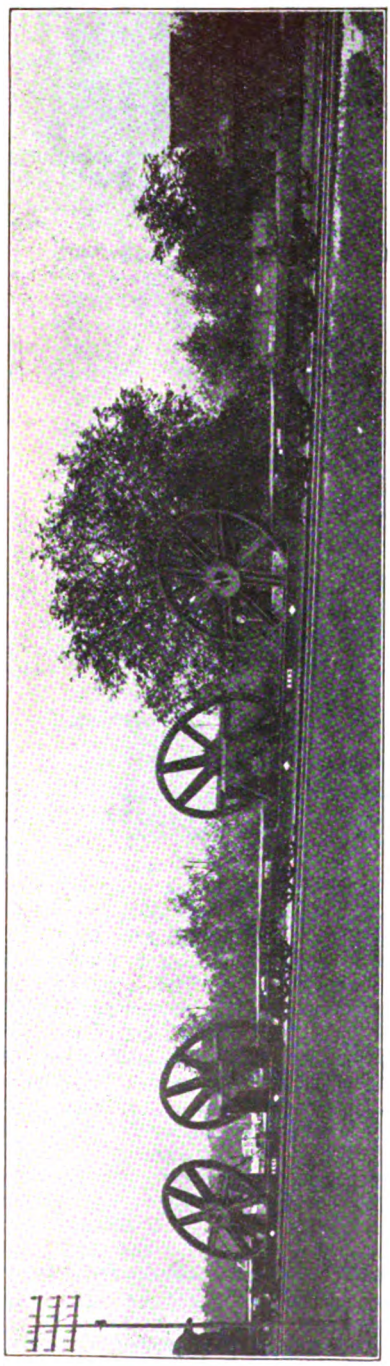
### Mr. H. L. King-Wilkinson's roblem.

A NUMBER of letters have been received from readers, including the following :— Thomas B. Sands, E. G. Twining, A. C. B. Brown, Herbert Wilkinson, J. R. Hollick and "Staffordshire Knot," and H. L. Simpson. All give the same solution, the 9.30 a.m. ex Newcastle (Central), which has South Wales and Bristol coaches. The sections travel together to York, and then proceed over the same route to near Swinton, but on different trains to Sheffield (Victoria and L.M.S. stations respectively). The main train is due at Gloucester (G.W.R.) at 5.10 p.m. *via* Nottingham (Victoria) and Banbury, while the Bristol through coach reaches Gloucester (L.M.S.) at 5.16 p.m. *via* Derby and Birmingham. Mr. Herbert Wilkinson points out that the corresponding return trains leave Gloucester at 11.3 and 11.19 a.m. respectively.



**OUT-OF-GAUGE LOAD CONVEYANCE ON THE F.M.S. RAILWAYS.**

We are indebted to Mr. A. T. Knight, on behalf of the Acting Traffic Manager of the Federated Malay States Railways, for the photograph reproduced and for particulars showing an out-of-gauge consignment loaded for transit from Port Swettenham. The load consisted of four crown wheels and one screen wing. The wheels and screen ring were for use in a tin dredge. In order to bring the wheels within the minimum structure gauge they had to be canted as shown.

### L.M.S.R. Locomotive Building Programme, 1929.

THE L.M.S.R. announces that 256 engines have been scheduled to be built during 1929. Of these locomotives, 134 will be used for freight traffic working ; 100 for passenger traffic ; and the remaining 22 can be used for either freight or passenger traffic as required. The actual types to be constructed are :— 100 0-8-0 freight tender engines ; 50 2-6-2 passenger tank engines ; 50 2-6-4 passenger tank engines ; 31 0-6-0 freight tank engines ; 22 2-6-0 mixed traffic engines ; three 0-6-0 dock shunting engines. The whole of these locomotives, with the exception of the 0-6-0 freight tank engines, will be built at the company's workshops.

### The Appearance of Locomotives.

PREVIOUS remarks under this heading have attracted a number of letters, some of which appear to justify editorial reference. Mr. I. J. Barwell endorses Mr. E. J. Davey's view that " the railway locomotive . . . appears to me to be a living creature," and pursues this analogy in somewhat interesting fashion, though space will not permit his remarks to be reproduced at length. Mr. C. A. Hunt suggests that in modern locomotive design angularity and a massive appearance seem to have superseded graceful curves and a pleasing outline. Furthermore, in many cases, when older designs have been rebuilt, they have lost much of their previous neatness of outline. " Stirling 4-4-0 " also sends some interesting remarks in the same connection, while Mr. F. H. Stingemore writes as follows :—

" Further to the remarks of Mr. Davey and Mr. Little in recent issues of the

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RAILWAY MAGAZINE, on this somewhat debatable subject, it is open to question whether the stove-pipe type of chimney is necessarily detrimental to an engine's appearance. For while, on the one hand, the stove-pipe adorned rebuilds of Mr. Drummond's erstwhile handsome '415' class are admittedly ugly in the extreme, it must surely be conceded that the later 4-4-0 express types and the 'Jubilee' 0-4-2 mixed-traffics of his precedessor, Mr. Adams, were, in their prime, particularly handsome machines. Standardization has its merits but it can be carried too far. To this cause, we think, many of the complaints made are attributable. In the original construction of the locomotive funnel, dome, smokebox and boiler received consideration in their related effect on the symmetry of the finished design. Nowadays, however, standard funnels, standard domes, standard boilers, are fitted, quite irrespective of what the new engine or 'rebuild' looks like. To appreciate this point with regard to one detail only, how completely and utterly is the neat and handsome appearance of Mr. Robinson's Great Central express and tank engines ruined by the new 'standard' London & North Eastern chimney.

"While on the subject of appearance, some reference might be made to the most regrettable decision of certain of the grouped companies to paint all but a few fancy types of locomotive black. The resulting effect is positively dismal. Whilst not suggesting that the locomotives and stations should be painted in futurist or cubist designs there is certainly a need for more brightness and cheerfulness in colouring as an inducement to travel. Black as a colour is scarcely inviting, and tends to produce an appearance of poverty. Brighter colours are pleasing, they give individuality and have considerable advertising value, a fact that should not be overlooked. One hopes that this is purely a temporary measure. Two other factors might be quoted which we think tend to cause some diminution in one's interest in locomotive matters in these days. The first is 'over-standardization,' to a different phase of which reference has been made previously. Thus, we find on the Great Western Railway, subsequent to the construction of numerous 4-6-0's and 2-6-0's of great uniformity, mysterious and wholesale withdrawals of such useful and handsome types as the 'Flowers' and the 'Atbaras'—in the former case after twenty years of service only. Secondly, whilst the jig-saw numbering of the locomotive stock of the late London & North Western Railway left much to be desired, surely things have gone to the opposite extreme with the serial numbers of to-day, with their monotonous sequences of high numbers culminating in seventeen thousand nine hundred and ninety something. Mr. Little in his selection of handsome types, should surely have paid some tribute to the Midland Railway Johnson single-wheelers, and on the score of neatness and beauty of design to the Brighton engines of the Stroudley regime."

## L.N.E.R. Traffic Working Notes.

MR. R. A. H. WEIGHT sends the following notes:—

The United Dairies' milk tank service is worked as follows:—From Ingestre the vehicles work up filled on the Stafford-King's Cross express milk train due King's Cross 1.47 a.m., thence by local milk train to East Finchley. About 11 a.m. every weekday they leave East Finchley empty, as a special train *via* No. 1 Box, Finsbury Park, to New Barnet, where they are attached to the afternoon milk empties train for the Midlands. On Sunday nights they have been noted on the 8.25 p.m. North Mail express from King's Cross on which they have been worked to Grantham.

A particularly good run was made by G.C. 4-4-0 5510 *Princess Mary* on the *Queen of Scots* express on January 2. Leaving Leeds 8 minutes late, with 320 tons she ran non-stop over the 186 miles in 197 minutes, and so achieved a punctual arrival at King's Cross. Driver Bumley, of Leeds.

Mainly owing to the introduction of third-class sleeping cars, and also on account of the daily Fort William through car which is now included in the formation, the 7.30 p.m. combined winter *Aberdonian* and *Highlandman* express from King's Cross has assumed enormous proportions for what is normally the "quiet season." The load on week nights' is almost invariably over 500 tons behind the tender—averaging about 520 tons—so that this train shares with the very composite 4 p.m. ex-King's Cross, the distinction of being the heaviest express regularly leaving London at the present time.

In connection with the interesting professional *v.* amateur Football Association cup-tie at Highbury recently, four special trains were required to bring Mansfield supporters to Finsbury Park and King's Cross. Two were composed largely of G.C. and G.N. dining and kitchen cars and were filled with excursionists who had also booked meal tickets, the other two being composed of ordinary stock. Two of these specials stopped at Grantham and two at Peterborough, the Colwick district engines working only as far as these points.



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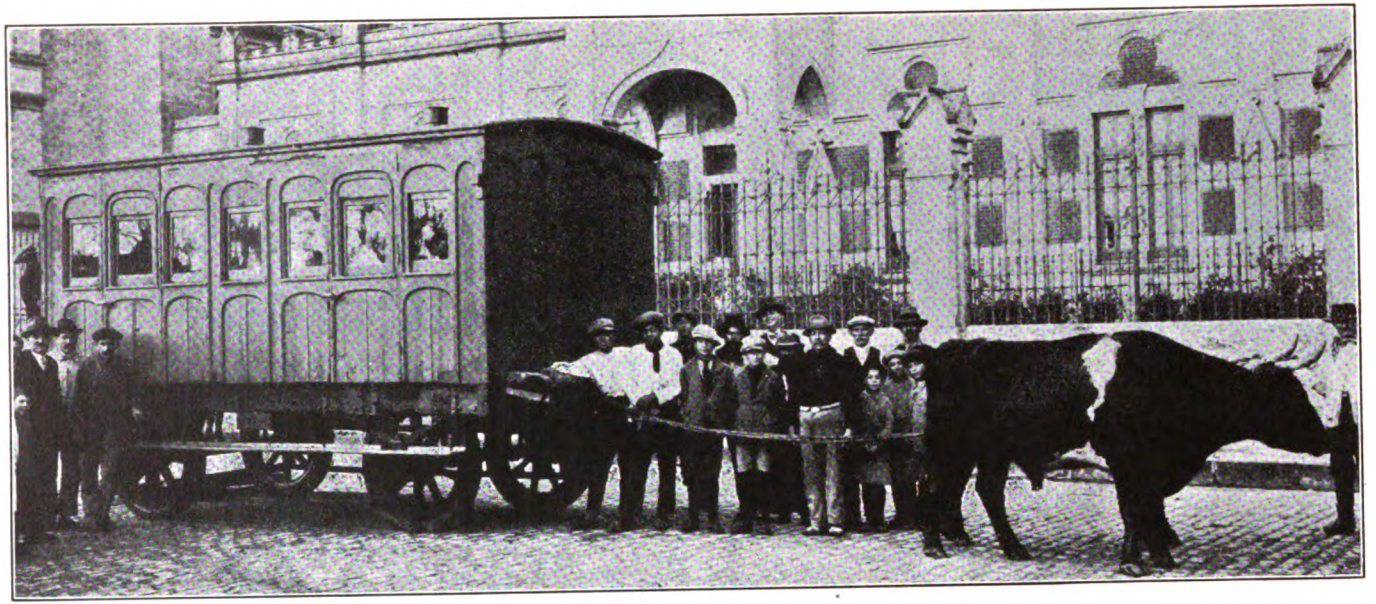
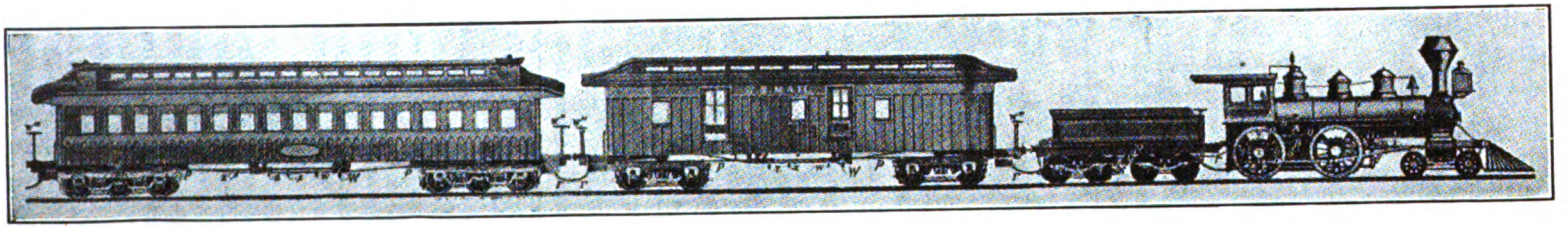


ONE OF THE ORIGINAL COACHES IN USE ON THE BUENOS AYRES WESTERN RAILWAY, EN ROUTE TO THE LUJÁN MUSEUM.



AN AMERICAN RAILWAY TRAIN ABOUT 1872.

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For the Crystal Palace *v.* Huddersfield match at Huddersfield, on February 16, a restaurant car special consisting of eleven cars was run from King's Cross and conveyed about 200 passengers. Pacific 2552 *Sansovino* worked it from London to Sheffield and back, with a momentary stop at Retford, whilst G.C. mixed traffic 5482 was employed between Sheffield and Huddersfield, *via* Penistone.

"It would be interesting to know if there is any parallel to the curious situation of an apparently flourishing vine which lives beneath a busy main line of four tracks. It grows in the passenger subway at Knebworth station near the roof and is really not far from the roaring traffic overhead!"

**Early Argentine Rolling-Stock.**

THE Buenos Ayres Western Railway has sent to the Museum of Luján one of the coaches which comprised part of the train of that line—the first in the Argentine Republic—which was inaugurated in the year 1857. The coach in question was previously stationed at Brian, near the River Riachuelo, in the Barracas district of the City of Buenos Aires, having served as accommodation for labourers. It has recently been overhauled and restored in the company's workshops at Liniers, and conveyed to the Lujan Museum, where a pavilion has been constructed for it alongside the one containing the historical locomotive *La Porteña*. The coach, which was equipped with wooden wheels to enable it to be hauled without damage over the paved road, was drawn by a pair of bullocks from Basiica station to the Museum.

This old vehicle, together with the locomotive *La Portena*, was acquired in London, in 1857 by Señor D. Norberto de la Riestral on behalf of the Buenos Aires Provincial Government, and was shipped from England on the ss. *Borland*. It has four wheels and is divided into compartments, without platforms, with side doors and steps on the English system—the type in use in Europe at that period. The seats are of morocco arranged transversely, cloth curtains being provided on the windows, the lighting arrangements consisting of two oil lamps.

Pine was employed in its construction, the underframe and shell being of English oak. The measurements are: 5·65 m. in length by 2·65 m. in width and 3·15 m. in height; the weight is 5,000 kils. (approximately 5 tons), and is therefore very much smaller than the present-day units, which weigh as much as 30 tons. The restoration of the coach was carried out under the supervision of Mr. J. W. Rea, Chief Mechanical Engineer, Buenos Ayres Western Railway.

**The Snape Branch, L.N.E.R.**

MR. R. W. FITZJOHN sends the following notes in regard to the Snape goods branch, from Saxmundham:—"The length of the branch, from Snape Junction to Snape terminus, is 1 mile 32 chains. The line is single throughout, but there are several sidings at Messrs. Swonnell's works. Snape Junction is midway between Wickham Market and Saxmundham. There is a length of siding on either side of the main line, with a cross-over in the main line itself. The line descends abruptly by the signal box as far as the one signal post on the line. The rest of the line is fairly level. There are three small bridges on the branch of the light timber sort, over small dykes. These are numbered 1107-9. The terminus, at Snape Bridge consists of two loading platforms, the single line branching into two just before the platforms are reached. The double line is continued over the road, into the malting works of Messrs. S. Swonnell & Son. From a wooden turntable for trucks, of the kind frequently met with near warehouses, there radiate lines to serve all parts of the works. One leads to a crane by the River Alde, for unloading and loading from barges. Some trucks were noted, lettered "S.S. & S. Ltd.," used on the works sidings, fitted with dumb-buffers, two-link chain couplings and no axle-boxes, &c. On week days a train leaves Snape Junction for Snape at 2.25 p.m., and Snape for Snape Junction at 3.5 p.m. On the occasion of the writer's visit the train was hauled by J. 15 0-6-0 No. 7941. The return trip is, of course, made with the engine running tender first."

**Locomotive Nicknames.**

MR. J. F. W. BOUGHTON, writing from Ipswich, suggests that the big G.E.R.2-4-2T's, now "8090" class, were at first known as "Jubilee Tanks," as No. 1090, the first, came out in 1897. He points out that the name "Stones" was applied to the G.E.R. small 0-6-0 tender engines, not 0-6-0T's.

Mr. R. Lockey refers to the L.N.W.R. 2-4-2T's as "Choppers," and the G.W.R 0-6-0 pannier tanks as "Square Bellies." The G.W.R. 0-4-2 and 2-4-0T's are sometimes referred to locally as "Flyers."

MR. R. A. MARTIN suggests that the three-cylinder compound 0-8-0's on the L.N.E.R. were the "Johnny Dugans" and not the 2-8-0's. The four-cylinder compounds were known as "Swammies," and the large-boilered 2-8-0's as "Big Swammies." He cannot suggest the origin of this peculiar name, though he knew a driver at Carlisle who was often referred to as "Swammie



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Joe." Mr. Martin also mentions other nicknames: "Bill Baillies" (4-6-0 four-cylinder compounds), named after the driver who had the first; while the "Greater Britain" and "John Hick" compounds were often called "Long-backs." Mr. C. C. Lindley mentions that the 1920 all-steel District cars were sometimes described as "Salmon Tins."

### 'Farther North by L.M.S.R.'

COMMENTING on the article entitled 'Farther North by L.M.S.R.," published in the January number, Mr. C. R. Clinker directs attention to several items not commented upon in the article, though noted by the writer. One is the fact that the signal wires at stations situated in "exposed" positions are carried on posts about ordinary telegraph-pole height, while the point rodding is completely encased in a wooden trough below the level of the ground, both being very necessary precautions in time of heavy snowfalls. He continues: "It is certainly a very beneficial feature that almost every train on the Highland section includes at least one corridor coach in its make-up, while many are entirely composed of such stock. The dining cars, too, are a very welcome feature, although in several cases they must be more of a convenience for travellers than a paying proposition. A distinctly interesting feature, also, is that there are combined railway stations and post offices at Orton, Dava, Delny, Kildonan, Forsinard and Altnabreac, the station-master serving in a dual capacity."

MAJOR MUNRO explains that the "Strathpeffer Express," in its earlier form, ran from Aviemore to Dingwell to serve Strathpeffer but the main train continued as the "Further North" express. Returning, the "Further North" did not bring the Strathpeffer passengers who travelled by the preceding ordinary train. Major Munro takes exception to the suggestion that "Black Isle" trains can be seen from the main line between Dingwall and Invergordon, as this is quite impossible owing to the contour of the line. The original remark was, however, given only as a passing suggestion.

MR. G. A. PEARSON, who also sends notes based on a journey over this section, asks about a platform on the down side between Bonar Bridge, Eddeston and Tain. Our contributor's notes do not serve to explain this. Mr. R. M. Comber asks about a light railway from Conon Bridge to Cromarty shown on some Scottish maps.

### From Manchester to Milford.

ON a recent journey from Manchester to South Wales by one of the North-to-West expresses of the L.M.S. and Great Western Railways, we were somewhat intrigued to have as near neighbours in the restaurant car four passengers for Milford Haven, and, not unnaturally, to speculate by what route they proposed to get there. The train concerned was the 12 noon out of Manchester. Of this the Cardiff portion is not due at Cardiff until 5.13 p.m., whence it becomes a slow train to Swansea, reaching there at 7.22 p.m. It is possible from Swansea to get as far west, in the Milford direction, as Carmarthen by 9.25 p.m., but that is the limit, until the night mail turns up at 5 o'clock the next morning, reaching Milford Haven at 6.55 a.m. Research as to the possibilities by way of the L.M.S. Central Wales line to Swansea or Llanelly, and from there onwards by Great Western, offered no better luck. A further lynx-eyed search revealed the surprising fact that, by that service from Manchester, the old "Manchester and Milford" line was the only practicable route. Reaching Shrewsbury at 1.56 p.m., the travellers would proceed at 2.27 p.m. for Aberystwith, due there at 5.5 p.m.; the southbound connection, which is presumably held, leaves there for Carmarthen at 5.10 p.m., reaching the latter town at 7.43 p.m., and this is just in time for the 7.50 p.m. to Milford Haven, due there at 9.35 p.m. the same night—not exactly a rapid journey but, at any rate, succeeding in its object. Whether a ticket from Manchester to Milford would be duly honoured by this singular route we have no knowledge; nor can we say by what route the four travellers were eventually persuaded to travel.

### A Curious Signalling Conjunction.

WHEN travelling recently in South Wales, we came across a singular combination of signals at the station known as Dowlais Top, which is very nearly the summit point of the late Brecon and Merthyr main line, over 1,000 ft. above sea level. From the south end of the station a short spur drops sharply down to join that isolated section of the London, Midland & Scottish Railway which cuts across the head of the South Welsh valleys from Merthyr to Abergavenny. The starting signals for the junction, arranged on a bracket post and level with each other, are both of the "somersault" type, as used on the Brecon and Merthyr and other Welsh lines prior to grouping. But the distant arm for the spur, under the appropriate starting signal, is controlled by the L.M.S. junction box at Dowlais Top, and is of the old L. & N.W. type, with corrugated arm pivoted at the post. On the very rare occasions when the home and distant arms

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on this post are pulled off together, if such a thing ever happens, the conjunction of somersault and pivoted arms must look curious indeed. One thinks of other similar possibilities in the immediate future, such, for example, as one of the new standard upper-quadrant semaphores as a starter above an ordinary lower-quadrant distant arm; the effect of the lower-quadrant arm above and the upper quadrant below would be even more striking, if both were pulled off together! Another curious feature of the Dowlais Top signals is that neither semaphore represents the practice of the Great Western Railway, which is the present owning company.

**British and Foreign Train Speeds.**

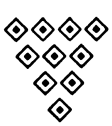
An interesting comparison was drawn by Sir Ralph Wedgwood, in his recent lecture at Darlington, between British and foreign express train services. In 1901, Sir Ralph had selected 20 services running in Great Britain and in the United States, and ranging in distance from 30 to 450 miles. At that time the British were quicker than the American services, the average speed of the former being 42·5 miles an hour, as against 40 miles. The American trains most nearly reached the British level in the short-distance services (up to 100 miles), and as the distance increased, the British lead became more marked. A further comparison has now been made for 1928 of the same services, with the result that the British average speed has declined to 41·9 miles an hour, and the American average has increased to 41·3 miles. In the short-distance services the American railways have now established a lead over Great Britain, although the long-distance speeds are still far below the British level. A similar investigation of 20 French and 20 German express services disclosed average speeds of 40·8 miles an hour in France and 36·6 miles in Germany. In point of frequency, the British and American services exceed the French and German in the ratio of 2 to 1. Taking speed and frequency together, the British services still lead the world, although this lead may not be retained. Sir Ralph considers that the work of our fast and intermediate trains should be overhauled and the timing tightened up, as has already been done with stopping trains, when a general improvement in speed will be obtained.

**G.N.R. (I.) Excursions.**

Mr. J. L. Spencer-Smith, of Friends School, Lisburn, sends some notes concerning special excursion trains recently run from Belfast to Dublin. These consisted of the 9.30 a.m. (third class), 10 a.m. (first-, second- and third-class), and 11 a.m. (first-class with restaurant car). The return fare was 25s. for first-class travel and included luncheon and dinner. On the 9.30, 10 and ordinary 10.15 a.m. train light refreshments were served. The 9.30 a.m. loaded to about 275 tons. The 10 a.m. was the most popular and had to be strengthened. Some restaurant cars were borrowed from the N.C.C., the G.N. stock being insufficient to meet all demands and at the same time those of the ordinary services. Mr. K. Davison also sends notes in regard to these trains. The latter mentions also a train from Cork to Dublin (Amiens St.) and worked by No. 501.

**Colour-Light Signals at Manchester.**

Part of the scheme for putting under one continuous roof the Victoria and Exchange stations at Manchester has been the re-signalling of the west end of the former and the whole of the latter station. The system of signalling adopted is the all-electric power operation of the Westinghouse Brake & Saxby Signal Company, and three boxes, containing respectively 95, 107 and 15 levers, will replace the Victoria West Junction, Irwell Bridge, Irwell Bridge ground frame, and Deal Street mechanical boxes at Victoria, and three similarly worked boxes in Exchange station. The aggregate number of mechanical levers to be replaced is 352, and the total of the power-operated is 217. Four-aspect day colour-light signals have been installed. As on the Southern Railway, red, as usual, indicates "danger," whilst green, as customary, signifies "clear"; one yellow intimates that a double yellow is being approached, and a double yellow calls for a stop at the next signal. Part of the installation—mostly at Victoria—was brought into use on Sunday, March 10, while further sections will follow in due course.



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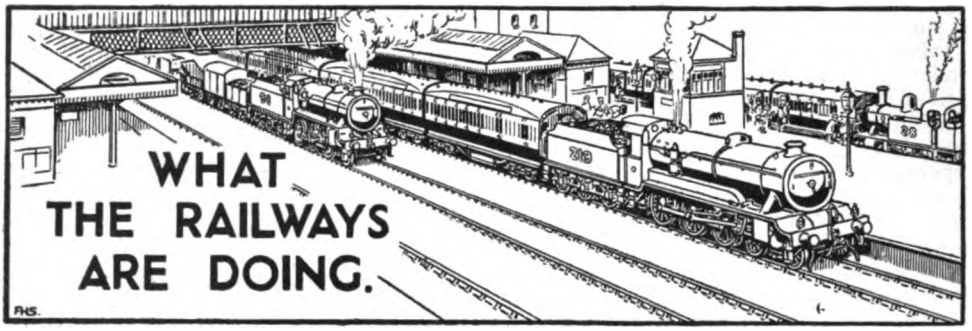

# WHAT THE RAILWAYS ARE DOING.

We regret to record the death of Mr. Bernard A. Firth, Chairman of Thomas Firth & Sons, a director of John Brown & Co., chairman of the Projectile & Engineering Co. and a director of the London & North Eastern Railway. He was formerly on the board of the Great Northern Railway Company.

* * *

The directors of the Great Western Railway have authorised the appointment of Mr. G. E. Orton, Assistant Publicity Agent to the Great Western Railway, to the post of General Agent in the United States and Canada as from May 1 next.

Mr. K. W. C. Grand has been appointed Assistant Publicity Agent to the company from May 1.

* * *

Mr. George Ernest Orton, Assistant Publicity Agent to the Great Western Railway, who has been appointed General Agent for the United States of America and Canada as from May 1 next, with headquarters at 505, Fifth Avenue, New York, has a wide knowledge of the places worth seeing in Great Britain and Ireland, and his experience should prove a valuable contribution on the part of the Great Western Railway to the new "Come to Britain" Movement. He entered the company's service in 1903 in the Advertising Department, and was transferred to the General Manager's Office in 1912, where he was engaged in the sections dealing with joint arrangements and private sidings, Board of Trade regulations, and accidents and new works. Except for a period of about 2½ years on war service, he remained in the General Manager's Office until February, 1923, when he returned to the Publicity Department, his appointment as Assistant Publicity Agent dating from April, 1926.

**MR. G. E. ORTON,**
Appointed General Agent, U.S.A. and Canada, G.W.R., as from May 1, next.

* * *

The Rt. Hon. The Earl of Bessborough, C.M.G., will preside at the 68th anniverary festival dinner in aid of the funds of the United Kingdom Railway Officers' and Servants' Association, which will be held at the Trocadero Restaurant, London, on Wednesday, April 17. Further information regarding this dinner and the Railway Officers' and Servants' Association can be obtained from Mr. Alfred James, 91, Moorgate, E.C.2.

* * *

Brigadier-General the Hon. Everard Baring, Chairman of the Southern Railway, has been appointed Chairman of the Railway Companies' Association for 1929–30. Viscount Churchill, Chairman of the Great Western Railway, was appointed Deputy Chairman of the Association.

* * *

Mr. F. J. Stannard, who retired on December 31 from the position of Land and Estate Agent, London Midland & Scottish Railway, entered the service of the old London & North Western Railway Company over 45 years ago. He eventually became District Estate Agent successively at Rugby, Birmingham and London, after which he was transferred to the chief office



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at Euston as Assistant to Mr. J. R. Ball. He was appointed Land and Estate Agent, London Midland & Scottish Railway, in November, 1924. Mr. Stannard was a prominent member of the Operatic and Musical Societies, and in his earlier days was a very keen Rugby football player.

* * *

MR. J. MACKIE has been appointed Superintendent of Road Services, Great Northern Railway, Ireland.

* * *

MR. JOHN FULTON, F.S.I., who has retired from the position of Divisional Land and Estate Agent (Scotland), joined the service of the Glasgow and South Western Railway Company in November, 1877. He served two years on general railway work, and entered the office of the Chief Accountant in 1880. When the Estate Department was first formed in 1888, he was transferred to it as Chief Assistant, succeeding the Factor or Estate Agent on the death of the latter in December, 1911. Mr. Fulton was appointed Divisional Land and Estate Agent with the grouping of the railways, now L.M.S., which embraced in Scotland the Caledonian, Glasgow and South Western and Highland Railways, extending from Carlisle to Thurso and Wick.

* * *

LT.-COL. E. P. ANDERSON, appointed an Inspecting Officer of Railways, Ministry of Transport, entered the Royal Military Academy, Woolwich, in 1900, received his commission as 2nd Lieutenant, R.E., in 1901, and went to the School of Military Engineering, Chatham. He afterwards took a course of Mechanical Engineering at Chatham Dockyard and completed that course in India in the Locomotive Department of the North-Western (State) Railway. In 1904 he joined the Engineering Department of that system as an Assistant Engineer, becoming, in 1912, an Executive Engineer. When war broke out in 1914 he was ordered to England and was for nearly two years Adjutant to Major N. Wilson, Railway Construction Engineer, No. 2, under Col. Sir W. D. Waghorn, the Chief Railway Construction Engineer. Lt.-Col. Anderson was afterwards Railway Construction Engineer in the 4th Army Area under Col. D. Lyell, being awarded the D.S.O., made a Chevalier of the Legion of Honour, and mentioned three times in despatches. He returned to India in 1919, and in 1921 became Executive Engineer, No. 1 Division, Khyber Railway Construction, under Col. Sir G. R. Hearn, whom he succeeded in 1922. After that work was finished, Col. Anderson held other railway engineering and operating appointments, and retired, as Lieut. Colonel, as from January 14 last, on his appointment to the Ministry of Transport.

* * *

MR. A. J. MESSER, Superintendent in Ireland for the Pullman Car Company since their introduction in Ireland, has resigned to take up the position of Assistant Catering Manager, Kenya & Uganda Railway. Mr. Messer, who served in the Royal Air Force during the war, spent six years with the Ste. Madeline Sugar Company in Trinidad, and acted as Traffic Superintendent for their railway. He was appointed Travelling Superintendent in the Pullman Car Service in 1925, and was promoted to Ireland in 1926.

* * *

MR. W. ASHDOWN, who has been appointed to succeed Mr. Messer with the title of Manager in Ireland of the Pullman Car Co. Ltd., was educated at Sandwich. He joined the Army in August, 1914, and served in France, where he was wounded. On demobilisation, Mr. Ashdown obtained experience in every branch of hotel working at the Metropole and Queen's Hotels, Folkestone, and in Belgium and Paris before joining the Pullman Company in 1919.

* * *

MR. HARRY DAVIS has been appointed Assistant, Central Office, London Midland & Scottish Railway, as from January 1, 1929.

* * *

THE L.N.E.R. announces that Mr. H. M. Collings, Chief Clerk to the London Suburban District Goods Manager, has been appointed Assistant to the London Suburban District Goods Manager, King's Cross.

* * *

THE following L.M.S.R. appointments were authorised recently :—

*Chief Engineer's Department.*

Mr. E. H. d'E. Darby, District Engineer, Manchester Exchange, to be Divisional Engineer, Derby.

*Estate Department.*

Mr. A. P. J. Ball appointed District Agent, Euston.

*Chief Mechanical Engineers Department.*

Mr. W. C. Goodchild appointed Chief Outdoor Assistant, Derby.

*Goods Department, Scotland.*

Mr. H. McNeilly appointed District Traffic Agent, Glasgow.

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Mr. T. M. Gallocher appointed Goods Agent, Mossend.

*Chief General Superintendent's Department.*

Mr. J. Tompkins, Stationmaster, Northampton (Castle), appointed Stationmaster, Coventry.

Mr. J. T. Bentham, Passenger Agent, Northampton (Castle), appointed Stationmaster, Northampton (Castle).

*Marine Department.*

Mr. L. T. Dudgeon appointed Master, Passenger Service, Holyhead.

Mr. W. Hughes appointed Master, Cargo Service, Holyhead.

*Chief Goods Manager's Department.*

Mr. R. K. Locke to be Goods Agent, Glasgow (College).

Mr. G. Edwards to be Goods Agent, Kilmarnock.

Mr. R. Hunter to be Goods Agent, Edinburgh (Lothian Road).

Mr. H. G. Waggett to be Goods Agent, Nottingham.

Mr. F. Edwards to be Goods Agent, Burton.

Mr. J. Inman to be Goods Agent, Leeds (Wellington Street).

Mr. E. Talbot to be Goods Agent, Dudley.

* * *

EALING Common station, Metropolitan District Railway, is shortly to be demolished and rebuilt. The new building will resemble those on the Morden line. It will be of Portland stone, surmounted with a double clerestory structure of steel framing and glazing. The station will have a frontage of 60 ft., and three new shops will be built adjoining it. The exterior will be floodlighted at night. The booking hall will be octagonal in shape. The latest type of ticket-printing and issuing machines will be installed, and the booking facilities doubled. A further improvement will be the widening of the stairways.

* * *

THE North-East Coast Exhibition is to be held at Newcastle-upon-Tyne from May to October next. It is 42 years since an exhibition of any size has been held on Tyneside, and in spite of abnormally bad trade conditions, more than 70 per cent. of the support necessary for the present effort has been forthcoming from well-known North-East firms. The L.N.E.R. exhibit will include the latest steam rail coach on replica track, a container on a road rulley, and a model of a railhead depot. Numerous special trains and excursions will be run by the L.N.E.R. from all parts of the company's system. His Royal Highness the Prince of Wales has graciously consented to open the Exhibition.

A DRAWING is shown, reproduced from the *Southern Railway Magazine*, of the long service medal which the directors have decided to present, as a token of their

appreciation, to members of the staff with 50 years' service or over. The medal is actually the size of a two-shilling piece. It is of solid gold, with the company's arms—representing the City of London, Southampton, Brighton and Dover in enamel, centred on a wreath of oak leaves.

* * *

THE English Electric Company has been awarded a contract by the L.N.E.R. for a Diesel-electric locomotive equipment comprising a 1,000-H.P. high-speed "Beardmore" engine, driving a 675-kW. "English Electric" generator and 10-kW. auxiliary generator with complete control equipment. This material will be mounted on one of the electric locomotives (used on the Shildon to Middlesbrough line), which is already equipped with motors, and will now be converted by the English Electric Company for Diesel-electric working.

* * *

ON Tuesday, February 26, the Prince of Wales visited the L.G.O.C. repair depot at Chiswick and the "Underground" overhaul works at Acton. He was met by Lord Ashfield on arrival at the Chiswick works, and in the party showing the Prince round were Messrs. G. J. Shave, Chief Engineer and Operating Manager, L.G.O.C.; A. Rozier, Supt. Rolling Stock, L.G.O.C.; C. Leese, Engineer-in-Charge; and H.

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Lansdown, Traffic Superintendent. At Acton, in addition to Lord Ashfield, the following officials of the company accompanied the Prince on his tour of the works :—Messrs. W. A. Agnew, Chief Mechanical Engineer ; E. Graham, Assistant Mechanical Engineer ; W. S. Graff Baker, Assistant Mechanical Engineer ; E. T. Brook, Superintendent of Rolling-Stock ; J. P. Thomas, Operating Manager, " Underground " Railways ; and A. R. Cooper, Chief Engineer.

* * *

THE seventh of the popular annual Bohemian concerts arranged by the Metropolitan Railway Athletic Association was held on Friday, February 22, in the Queen's Hall. The chair was occupied by the Right Hon. Lord Aberconway, P.C., J.P., who was supported by many officers of the Metropolitan Railway and also of other companies. A particular feature of the concert was, as in past years, the engagement of the band of His Majesty's Grenadier Guards, by permission of Col. Lord Henry C. Seymour, D.S.O., and under the direction of Capt. G. Miller, L.R.A.M. A recital at the grand organ by Mr. A. Harriss preceded the concert, Mr. Harriss also taking part in the later programme, while Mr. David Richards accompanied at the piano. A thoroughly enjoyable programme was provided to which a number of well-known artistes contributed. A new feature was the inclusion of a Cabaret Show, arranged by Mr. Gordon Marsh. The arrangements were made by the concert committee, of which Mr. T. Wilding was Chairman, Mr. S. Brown, Hon. Musical Director, and Mr. W. R. Squire, Hon. Secretary.

* * *

AN extended L.M.S.R. motor omnibus service has been instituted between Boxmoor and Harpenden, *via* Hemel Hempsted and Redbourn, to enable passenger train services on the branch to be reduced at the hours of business travel. The 'buses give a service at close intervals between Boxmoor station and Hemel Hempsted (Broadway), with about 12 trips each way (four on Sundays), continuing onwards to Hemel Hempsted station, to Redbourne and, in most cases, to Harpenden stations. Daily and weekly workmen's tickets are issued, as also cheap market tickets, while combined omnibus and railway facilities are offered to and from Luton. Arrangements have also been made for the issue of monthly season tickets and for the inter-availability of railway tickets on the omnibuses.

* * *

IN order to avoid the necessity for disturbing passengers through Carlisle on night trains for ticket inspection, the station is now closed to non-passengers during the night hours, the platform ticket system being adopted during this period.

* * *

THE L.N.E.R. has instituted a new method of collecting and delivering rail traffic in the Cleveland district. Instead of traffic being dealt with at a number of small stations as hitherto, it will in future be transferred to or from rail at Guisborough station, from w. ich point a fast road motor service is in operation, covering the districts of Brotton, Skelton, North Skelton, Boosbeck, Lingdale, Moorsholm, and Margrove. This has the double advantage of speeding up the transit of traffic and of providing a collection and delivery service for goods traffic at cheap rates throughout the whole area. Traffic in full wagon loads continues to be dealt with at the appropriate stations. A similar service also operates from Stockton, L.N.E.R., covering the Stokesley and West Cleveland district. In this instance the motor service caters for goods carried locally between that town and the neighbouring villages in Cleveland. Another service of this kind will shortly be opened in the Darlington district to provide for the populous neighbourhood of Bishop Auckland and Spennymoor.

* * *

THE L.N.E.R. has issued instructions to car attendants that both first and third-class sleeping-car passengers are to be requested to hand over their tickets at the commencement of their journeys, thus ensuring an uninterrupted night's rest. The longest nightly run by L.N.E.R. sleeper is King's Cross to Fort William—560 miles.

* * *

THE London & North Eastern Railway has placed further orders for Sentinel-Cammell steam rail cars as follow :—Twenty-eight 100-H.P. and two 200-H.P. single-unit cars and one twin 200-H.P. car.

* * *

THE new Southern Railway Time-Table book, covering the new services beginning March 3, contains two coloured insets which will undoubtedly be a great convenience to the travelling public. The blue inset gives the principal Continental services between London and Paris, Brussels, Berlin, Rome, Vienna and the Channel Islands, together with details of fares, Pullman supplements, &c., and the pink inset gives a summary of the principal express services between London and the South and South-West

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Coast resorts, with the week-end ticket fares and their availability.

* * *

COMMENTING upon a "Pertinent Paragraph" in the December number, on the Stratford and Moreton Tramway, Mr. P. R. Gale points out that the Great Western Railway received statutory powers to abandon this tramway under the G.W.R. Act of 1926.

* * *

J. WALTON writes as follows: "Having to wait several minutes for my train—an A.C. electric—to leave Coulsdon this afternoon, I walked up to and looked into the motor-van or locomotive. I noticed a faint humming from it at first, which might have been due to a static transformer. About three minutes before the train started, there was a loud whirring as of some heavy motor starting up, which piece of apparatus continued to 'whirr' for the duration of the journey. Can you tell me what caused these two noises? It was not the Westinghouse compressor."

* * *

MR. H. GOULD, JUN., writes as follows:—"The construction of the platform connecting No. 3 platform at Exchange station, Manchester, and No. 11 platform at Victoria is now complete, and it is now possible to walk the whole length, although it is not yet in use. The signals and points of the two stations are to be operated electrically, and already new signal boxes and coloured-light signals have been erected. The track layout outside Exchange is being altered somewhat to connect up the lines leading into Victoria station."

* * *

THE Great Southern Railways of Ireland have placed an order with Clayton Wagons Limited, of Lincoln, for six "Clayton" steam rail cars.

* * *

THE following stations on the G.N. section of the L.N.E.R. have been re-named as follows:—"Mill Hill for Mill Hill Barracks" to be "Mill Hill East for Mill Hill Barracks"; "The Hale for Mill Hill" to be "Mill Hill for The Hale."

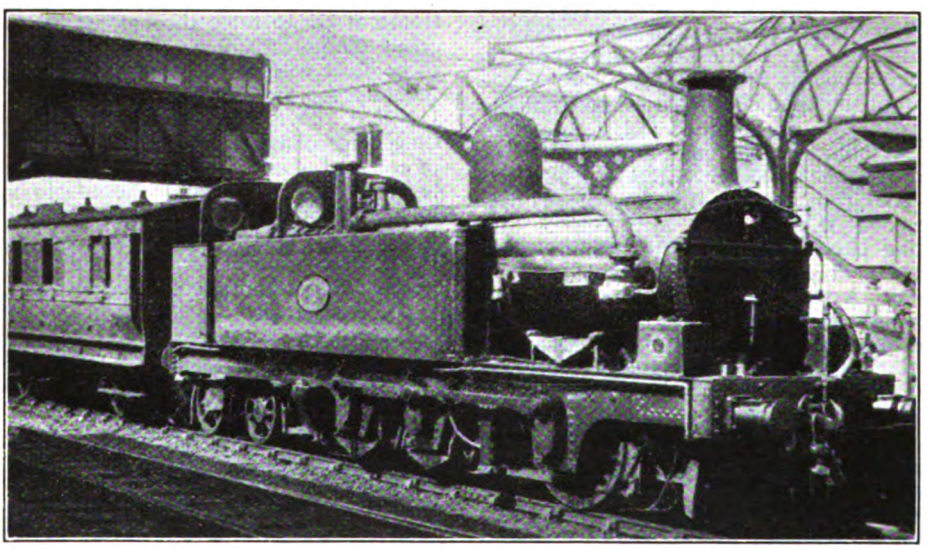

*Photo.*] THE MERSEY RAILWAY IN STEAM DAYS. [*R. Lyle.*

THE third photograph reproduced on page 118 of the February number of the RAILWAY MAGAZINE was taken by Mr. W. Leslie Good.

* * *

WHEN you see "Sleeper Pass" above a paragraph in a country newspaper, do not be misled into thinking it is a new form of railway privilege, or the introduction to a journalistic attack upon so-called deadheads. A sleeper pass is an inspection by officials of sleepers for Departmental purchase. If they are passed, all is well; if not, they are passed out.—From *The Staff, New South Wales.*

* * *

MR. E. J. NORRIS points out that the first gradient board on the L.N.W.R. main line from Euston is about half-way along No. 6

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platform. The board shows the gradient of one in 149 (up) changing to level. He suggests that it is distinctly unusual if not unique to find a gradient board actually in a big terminal station.

* * *

MR. R. W. HARRE sends another railway conundrum. He asks where, travelling from London on a main line, does one pass over a stretch of between two and three miles on which one is (according to the mileage posts) over 20 miles nearer London than immediately before and after that stretch.

* * *

COMMENTING upon the old engine *Lion*, described on page 485 of the December number, Mr. A. Cruise writes as follows:—"I was employed as locomotive driver under the Mersey Dock Board from 1877 to 1881 and knew this engine well. But I want to know what became of four other engines, 2-2-2, which came from the Manchester and Liverpool and were employed to work Mr. Hartley's chain pumps, each of which was capable of lifting 25 tons per minute. The other four were at work on the Langton Dock at the North end. I was relieving man for some time and used to be with these engines one day each week. The first one I wish to know about was built about 1845 by Tayleur & Co., Vulcan Foundry, St. Helens. It had a 14 in. cylinder steam chest on top of cylinder, with rocking shaft for the gab, but was fitted with a quadrant and large link that fitted on to the crank pin of the rocking shaft, giving three notches on the lever rack. The other three were two by Fairbairns and one by Bury, Curtis & Kennedy; gab motion, leading and trailing wheels 3 ft. 7 in., drivers 5 ft., all single engines. I was told by Foreman Weatherburn that they were all reboilered at the North Yard about 1865." He asks whether any reader can give further information.

* * *

MR. L. G. LONGMORE writes as follows: "I thought it might interest RAILWAY MAGAZINE readers to know that the ship which represents the U.S.S. '*Julien*' in the film entitled 'Q Boats,' is undoubtedly one of the G.W.R. Weymouth-Channel Island steamers, *St. Julien* or *St. Helier*, very probably the former. I might add that the ship is supposed to be an Atlantic liner stopped by a "U" boat, but, as can be readily imagined, the G.W.R. boats do not, even when seen from a distance, resemble a large liner. This anachronism—for such it is, by reason of the fact that these railway steamers were not built until some years after the war—needless to say destroyed to a large extent the realistic effect of this part of the film—in many respects an excellent one. I wonder how many other railway enthusiasts who have seen this film noticed this point."

* * *

COMMENTING upon Mr. Nevile Reid's notes on French railways, published in the December number, Mr. C. Leaf explains that the American locomotives referred to were brought over during the war for R.O.D service, and may be seen operating all over the country. He adds: "Most of them are 'Consolidations' (2-8-0). A number of those seen on the Nord have had the height of the chimney doubled, which detracts much from their otherwise very neat appearance.

* * *

*The Bombay, Baroda and Central India Railway Magazine* has reprinted, almost in full, the article on "Oil Engines for Rail Cars and Locomotives," published in our June number, 1928.

* * *

WE are informed by the Antofagasta (Chili) & Bolivia Railway Co. Ltd. that the work of changing the gauge of their lines from 2 ft. 6 in. to 1 metre has been completed, and that all traffic throughout their system is now handled on the metre gauge.

* * *

ON the New Zealand Government Railways every first-class seat earned £36 13s., and every second-class seat £29 4s. during the year ended March 31, 1928, the total seating accommodation provided being 19,618 first-class and 49,075 second-class seats.

* * *

WRITING in regard to a recent inquiry, Mr. C. Selby Wilkinson suggests that the crest noted on a late H. & B. 0-6-0 is the bomb and chevrons carried by engines which saw service in France during the war. He also points out that L.N.E.R. Nos. 4–10 are class "C" 0-6-0's, from which we gather that the electric locomotives are numbered independently of the steam engines.

* * *

MR. E. H. CLARKE mentions the varied colour scheme presented by the Paris-Strasburg "Rapide," as noted at the Gare de l'Est, Paris, as follows:—(1) Van, Est, green; (2) 3rd, Est, brown; (3) 3rd, Est, brown with black upper panels; (4) same as No. 3; (5) same as No. 2; (6) 1st and 2nd, Czecho-Slovakian, greenish-grey; (7) International Sleeping Car, varnished teak; (8)

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2nd (couchettes), Est, green; (9) 1st (couchettes), Alsace-Lorraine, green; (10) International Sleeping Car diner, varnished teak; (11) 1st and 2nd, Saar Railway, grey.

* * *

CHARLES ROBERTS & CO. LTD. have received an order from the London Midland & Scottish Railway for two 60-ton bogie trolleys for carrying transformers.

* * *

AN Ipswich reader writes:—"In reply to your correspondent, Mr. R. W. Fitzjohn, the numbers of the 0-4-0T engines on the Great Eastern section are as follows:—7210 and 7226–7231 (inclusive). No. 7210 is shedded at Stratford, and is used in the works, having replaced the small 0-4-0T *Chairman*, which was scrapped some years ago. No. 7227 is used for shunting at Canning Town Wharf, while No. 7231 is stationed at Colchester, where it is used for shunting at Hythe Quay. Several are believed to be at Temple Mills. All were saddle tanks and were classed "B77," except No. 7227, which is an outside cylinder side tank, and is classed "B74." The 7125–7139 class of tram engines were originally 0-4-0T, but most, if not all, have now been rebuilt as 0-6-0T. It would be interesting to know if any of these curious engines are still running as 0-4-0T."

* * *

IT is reported from New York that Mr. Patrick Connolly, a motorman on the Sixth Avenue Elevated Line, New York City, has been elected a director of the Interborough Rapid Transit Company.

* * *

THE following changes in G.W.R. station names have been made:—Goodrington Halt renamed Goodrington Sands Halt; Gilfach, renamed Gilfach Goch.

* * *

REFERRING to a report of his lecture published in the February RAILWAY MAGAZINE, Mr. J. Pelham Maitland points out that the references on page 156 to "three-phase 650 volts A.C." and "the Paris Electrical Company" should read "1,500 volts D.C." and "a Paris electrical supply company."

* * *

MR. J. F. W. BOUGHTON points out that the article "The Norfolk Lines of the L.N.E.R." is in error in including any portion of the Mildenhall line, as the southern part, including Foraham Junction, is in Cambridgeshire and the remainder in Suffolk. We cannot now trace how the error arose, as the article was prepared some considerable time ago, but must attribute it to some unexplained misreading of a map at the time.

* * *

MR. F. E. BAWDEN, writing from Ottawa, Canada, directs our attention to what is described as a record-breaking run for a silk train. After completing a record 61-hour run from Vancouver to Toronto by rail, a silk train arrived in Toronto with a cargo of raw silks valued at close to half a million dollars. Speed is the first consideration in the transportation of silk, due to its perishable nature, and the train bearing the valuable cargo is given the right of way over all trains. The trip recently completed is a record, the cars covering the 3,000 miles from Vancouver to Toronto at an average of almost 50 m.p.h.

* * *

A SPECIAL Boulogne-Hyères carriage has been added to the through "Riviera Rapide" which runs from Boulogne in connection with the 1.50 p.m. boat train from Victoria. Arrangements have been made whereby luggage registered by this service to Hyères will be examined by the French customs at destination. This coach provides ordinary first- and second-class seats and sleeping accommodation in the form of Lits-salon.

* * *

IT is reported from Berlin that the P.L.M. Railway has placed an order with Henschel & Sohn, of Cassel, for the construction of a high-pressure locomotive, the boiler of which will be designed to carry a pressure of 1,000 lb. per sq. in. It is calculated that this will effect a 20 per cent. saving in coal consumption as compared with the most modern of the other locomotives in use on the same system. It is anticipated that the weight of the new locomotive, when empty, will be 109 tons.

* * *

FOLLOWING the British railway practice of painting in distinctive colours fast passenger locomotives, the Canadian National Railways have adopted a colour scheme of emerald green, flame red and black for their famous "6100 Northern type" engines used on the crack trains of the system and which are among the "largest and most powerful passenger locomotives in the world." Emerald green, the predominating colour, is used for the boiler, tender, tank and wheels. The cab, smokebox, coal hopper and feed-water heater are black; the

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buffer beams at either end, the spokes of the wheels and the fluting of the driving rods, are in flashing flame red.

* * *

A NEW subway, 190 ft. in length, is to be driven at Tottenham Court Road "Tube" station, so that passengers may reach as well as leave the Hampstead line platforms at the south end. This will relieve the congestion which now occurs during busy hours at the north end of the station.

* * *

To safeguard passing trains from rocks which might fall from cliffs alongside the Easton & Church Hope Railway, a wire screen, 211 yards long, is being fixed alongside the line, 6 ft. from the nearest rail, and 11 ft. above rail level. A stop signal is to be provided on the up grade, 200 yards to the rear of the screen, and one on the down grade, about 400 yards to the rear of the screen. These signals are connected to the screen, and in the event of a breakage of any of the wires in the screen, the signals will be put to danger and bells operated in the signal-boxes at Easton and Portland stations.

* * *

THE L.N.E.R. announces that plans for extending the coaling facilities at the Hartlepool Docks have been approved and work is to be put in hand immediately.

* * *

A CONTRACT for important alterations to the bridge over the Zambesi just below the Victoria Falls has been let to the Cleveland Bridge & Engineering Company, of Darlington. The original bridge was built by this firm and was opened for traffic in 1905; it carries the Rhodesian Railway, is 420 ft. above the water level, and has two sets of rails. It has been decided to alter it to carry one set only; the remaining space is to be devoted to a motor way and also a way for foot passengers. The designs for the alterations have been carried out by Sir Douglas Fox and Partners.

* * *

FIFTEEN cars with a Vita-glass solarium, observation lounge, women's lounge and bath-room, men's bath, smoking rooms, buffet and valet service, are being constructed for service on the "Trans-Canada" express between Montreal, Toronto, and Vancouver, and on the "Mountaineer." which operates between Chicago and the Pacific coast. These cars will be completed at the C.P.R. Angus shops in time to be included in the train complement when the "Trans-Canada" makes its initial run on May 12, and the "Mountaineer" on June 10.

MR. H. G. DRING, European Passenger Manager, announces that for the current year a special series of tours to the Dominion have been arranged by the C.P.R. They will embrace periods ranging from three or four weeks, thus enabling tourists to take in Quebec, Montreal, Ottawa, Toronto, and Niagara Falls, to a more extensive trip of, say, 8 or 10 weeks.

* * *

REFERRING to the railway developments in the Rochester area, Mr. H. Dixon Hewitt points out that the history of the Toomer loop is somewhat interesting. The North Kent line was opened to Strood and Maidstone in 1847. The L.C. & D. line was opened in 1861, without a physical junction. The Toomer loop was opened in 1878, but no through running followed. In 1892 the S.E.R. independent line to Rochester and Chatham was opened, duplicating the Toomer loop. About 1909 the Chatham Central service was replaced by a rail-motor shuttle service. In 1911 the Chatham Central section was abandoned, except from Strood to the Rochester side of the bridge. This year the L.C.D.R. bridge has been closed and all trains diverted to the later bridge.

* * *

MR. J. MACARTNEY ROBBINS points out that the reference, on page 508 of the December number, to a 4-4-2 locomotive, No. 231, having been noted at Kingsbridge station, Dublin, cannot be correct, as there are no 4-4-2 tender engines in Ireland. It is suggested, however, that No. 231 is a 4-4-2 tank engine.

* * *

REFERRING to the recent sale of the G.W.R. ss. *Reindeer*, built at Barrow in 1897, to be broken up, Mr. C. J. Coghlan points out that this vessel had a most distinguished war record. On May 27, 1915, when the old battleship *Majestic* was torpedoed in the Dardanelles, most of her crew were rescued by the *Reindeer*, then serving as a mine-sweeper. On June 12, 1915, while acting as a transport, she left Mudros at night with the 4th Bt. Royal Scots on board for the Dardanelles, steaming at 17 knots she collided with and sank the G.C.R. ss. *Immingham*. The crew of the latter scrambled on to the *Reindeer*, and all were saved. The *Reindeer* had a rent in her side, 30 ft. long, only a few inches from the waterline, and had to return to Mudros. The Southern Railway recently sold the *Folkestone*, built at Dumbarton in 1903, to Major Henry Keswick, Cowhill Towers, Dumfries. The G.W.R. fleet now

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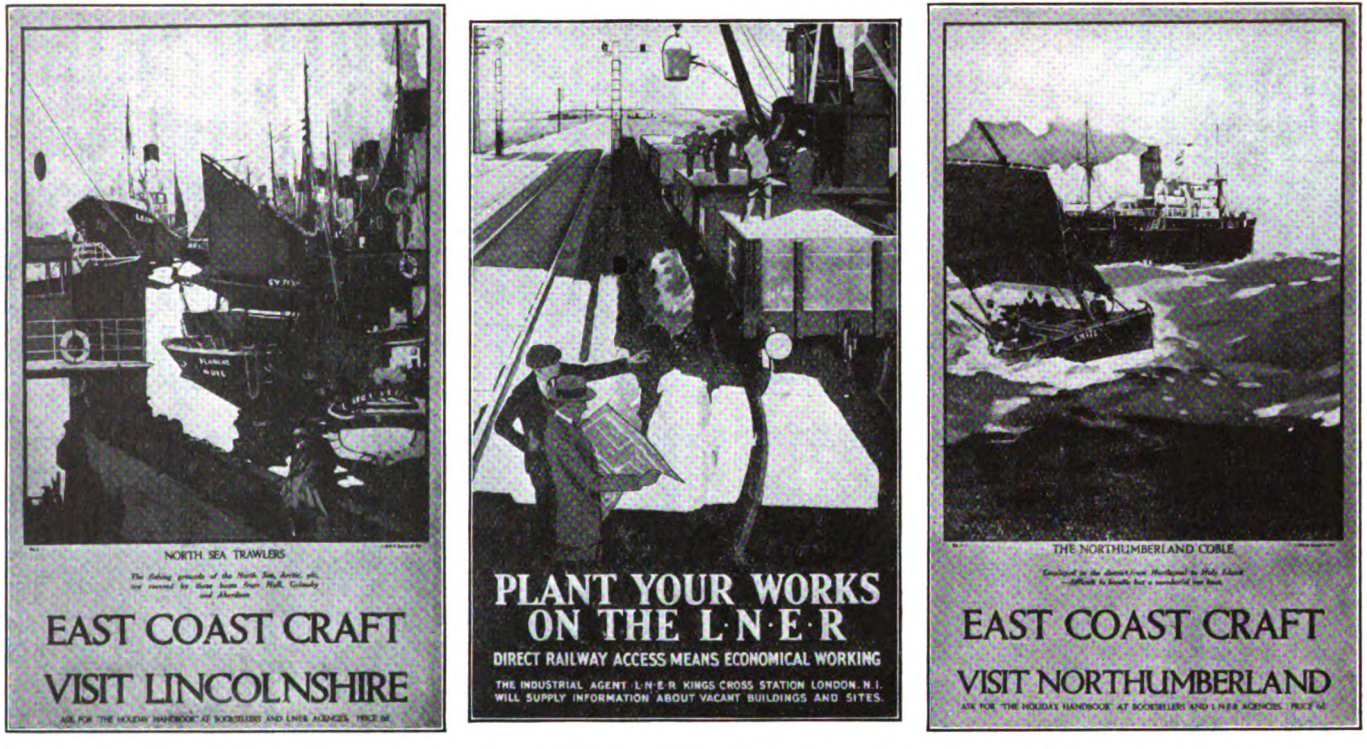
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**THREE OF MANY L.N.E.R. POSTERS EXHIBITED AT THE NEW BURLINGTON GALLERIES, MARCH 13-21.**

The exhibition was opened by Lord Dewar, who was accompanied by Sir Ralph Wedgwood, Chief General Manager, and Mr. C. Dandridge, Advertising Manager.

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includes two small paddle steamers, *Ilton Castle* and *Kenwith Castle*, which they took over from local owners at Salcombe, Devon.

* * *

COMMENTING upon enquiries as to Southern Railway locomotive working to Birmingham, Mr. E. J. Norris mentions that for some summers past there has been a regular Southern working from Bournemouth to Wolverhampton. The engine, from Bournemouth Shed, often No. 288, works up on Fridays on the 9.40 a.m. excursion train, due Wolverhampton 3.45 p.m., returning on Saturday on a relief of the Birkenhead-Bournemouth express. At the same time, a G.W.R. Wolverhampton engine, usually a "City," takes the 2.30 p.m. excursion to Bournemouth (due 7.36) on Fridays, returning on Saturday as a relief of the Bournemouth-Birkenhead. This working has been in force for three or four summers now.

* * *

COMMENTING upon "Voyageur's" annual article dealing with train service developments in 1928, published in the November number, Mr. F. G. Spindler mentions that the Great Western through train from Birkenhead to the South East of England includes a restaurant car attached from Birkenhead to Margate, apparently in addition to that from Birkenhead to Deal.

* * *

IN addition to the electrically-operated carriage-washing plants, installed by the L.N.E.R. at Ilford and Cowlairs, it is proposed to install carriage-washing plants of an improved design at York, Craigentinny, Bridgeton Cross and Heaton.

* * *

THE L.N.E.R. reports that the West Riding, Pullman hauled by 4-4-2 engine No. 4442 (Driver Sparshott), made an exceptionally fast run on January 23. The whole distance from Wakefield to King's Cross (176 miles) was covered in 175 minutes in spite of one cautionary stop and a severe slack for signals *en route*. The 156 miles from Doncaster were covered in 149 minutes, the last 105¼ miles from Grantham taking only 98 minutes.

* * *

WHEN the conversation drifts to long engine runs, the feat of Engineman H. S. Small and engine No. 149 of the old Central Pacific should not be forgotten. In 1876 Messrs. Jarrett and Palmer chartered a special train from New York to San Francisco. Small hooked the 149 on the train at Ogden, Utah, and both the locomotive and the engineman ran through to Oakland, California, 883 miles, without relief. The run was made at an average speed of more than 36 miles an hour, through extremely mountainous country. It will always remain a remarkable feat of endurance of man and machine.—*Railway Age.*

* * *

MR. H. H. SHEPARD, Vice-President, Brooklyn Eastern District Terminal, recently wrote to the *Railway Age* (U.S.A.) as follows:—

"I was much interested a few days ago in running across an almost perfect description of the 'modern' container system, written by Dr. James Anderson, an Englishman, in 1801, long before the introduction of the steam locomotive. Dr. Anderson wrote: 'Suppose a railway were brought from the wharves to Bishopsgate Street . . . all the wagons to be made of one size and form, each capable of containing one ton of sugar or other goods of similar gravity. Let the body of each of these wagons be put upon a frame that rests upon the two axles of the four wheels calculated to move only upon the railway, and let each of these wagons be loaded with goods which are to go to the same warehouse or its vicinity. The whole of the wagons being thus loaded, they are moved forward till they come to the end of the road at which place they should be made to pass under a crane. The crane would lift the wagon upon another truck formed for street use, and when emptied at the close of the day, returned to the railway truck, which returns to its point of departure.'"

* * *

DURING the period of war economies, Twerton passenger station was closed and was never re-opened being eventually dismantled. Twerton is a large industrial suburb of Bath, with a population of some 15,000; and frequent requests for the restoration of pre-war rail facilities have been made by the residents. Increased motor 'bus services between Bath and Bristol were introduced some months ago, and this development has quite possibly been a factor in gaining the provision of the new halt.

* * *

MR. G. T. MOODY, writing in regard to old L.B. & S.C.R. vehicles in sidings at Streatham Hill, refers to a 14-coach close-coupled train, in two sections of seven vehicles, seating six a side, and still painted in L.B. & S.C. colours. This train is understood to be the only one of its kind owned by the L.B. & S.C.R., and to have been built for use on the South London line prior to electrification.

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For some years, until June last, it was used regularly for certain business services between London Bridge and Thornton Heath. He continues: "At London Bridge (Central Section), extensive repairs to the roof are in progress. In connection with this work, a curious old vehicle can be seen in the siding adjacent to No. 22 platform. It is a four-wheeler, with long wooden-faced buffers, and was originally a carriage brake, with two passenger and guards compartments. One oil lamp was supplied for the guard, and one between the two compartments. The roof still carries the old-time luggage rails. This quaint survival is inscribed: 'S.R. Engineer's Painting Dept. 0.627.5.' The axle-boxes are lettered 'S.E.R.'"

* * *

MR. A. W. V. MACE writes: "The 4.15 p.m. and 5 p.m. London–Folkestone expresses on the S.R. are now running with new corridor stock, bow-ended, and generally similar to that on the 'Atlantic Coast' expresses. The train is made up of four-coach sets, with brake composites at either end, and the Pullman car in the middle of one of the two sets making up each train. Some of the coaches have corridor windows reaching right up to the roof (G.N.R. fashion), necessitating the words 'Southern Railway' being placed on the waist line of the coach. The coach number, however, is written in the usual position over the end windows, which are lower."

* * *

MR. J. RIGBY mentions that the Londonderry and Lough Swilly 2.30 p.m. Graving Dock (Londonderry) for Cardonagh, Thursdays and Saturdays only, is named the *Atlantic Express*, though it takes 1 hr. 25 min. to cover 30½ miles.

* * *

THE Model Railway Club Annual Exhibition will be held at the Kingsway Hall, on Wednesday, April 17 to Saturday, April 20. It opens each day at 11 a.m., except the first day, the Wednesday, when it opens at 2 p.m. It closes daily at 10 p.m. In addition to the models on show, the passenger-carrying track will be at work, as also the gauge 0 track. This latter, which was not working last year, will, like the passenger track, be in fairly continuous operation. Admission, adults, 1s. 2d., and children under 12, 6d., including tax.

* * *

THE British railway companies combined exhibit at the 1929 British Industries Fair at White City, London, February 18 to March 1, demonstrated the door-to-door service provided by the companies by means of road-rail containers. The principal items were a loaded container on lorry, and an empty container on the ground, open for public inspection; also models of steamer and engines, literature, &c. A somewhat similar exhibit was arranged at the Birmingham Section of the Fair. Copies of an attractive folder, giving full information respecting the advantages of containers and methods of use, were widely distributed from both stands. This was shaped like a container, was attractively printed in red on bright yellow, and served as a sort of envelope to a concise and well-written account of the "Key to the Traders' Transport Problem." The various points of the system were detailed, and a number of interesting and helpful illustrations were appended.

* * *

TOWARDS the end of last year, arrangements were made, through the Railway Clearing House, and with the approval of the general managers, that the four main-line railways shall advertise jointly at Christmas, Easter, Whitsun and August Bank Holiday in the London papers, instead of each taking space independently for exactly the same facilities. The L.M.S.R. Publicity Department, it will be recalled, was responsible for the announcement with regard to the Christmas excursion arrangements. As regards Easter, the four railways again made a combined appeal to the travelling public in the shape of an 11-in. double-column advertisement in some of the morning and evening papers. This time, the advertisement was the work of the London and North Eastern Railway Company.

* * *

THE Great Western Railway provides third-class sleeping-car accommodation on the 9.25 p.m. Paddington-Cardiff-Swansea-Neyland express, and the 6.30 p.m. Neyland-Cardiff-Swansea-Paddington express. Passengers on the latter train are due at Paddington at 3.30 a.m. They may, if they wish, remain in the cars until 8 a.m.

* * *

AT the monthly meeting of the Railway Club, on March 4, an interesting paper was read by Mr. G. S. Walker on "Crime and the Iron Road." A good programme of visits, &c., has been arranged for April, and dates onwards.

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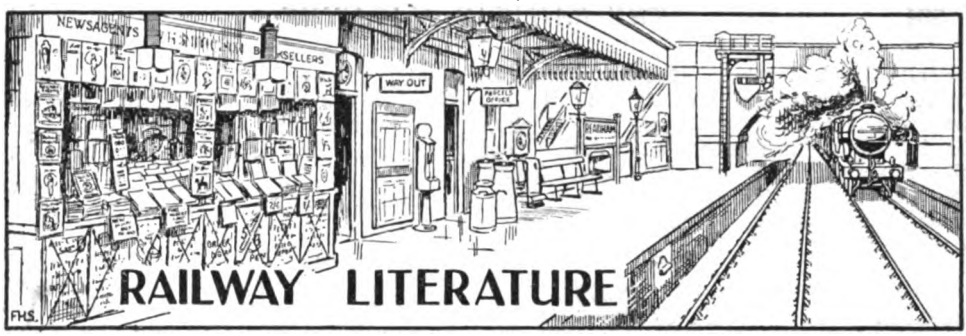


MATTHEW MURRAY : PIONEER ENGINEER. Edited by E. Kilburn Scott, Assoc.M.Inst. C.E. Leeds : Edwin Jowett Limited, Park Street. 1928. Cloth, 3s. 6d.; paper, 2s. 6d. —This volume is issued by the Matthew Murray Memorial Fund, which is intended to perpetuate the memory of a hitherto unknown pioneer and contemporary of Boulton & Watt, and the proceeds of the sales will go towards carrying out the memorial scheme, which includes the erection of commemorative tablets and the founding of annual prizes for mechanical drawing. The compilation of these records, extending from 1765 to 1826, seems to have been a labour of love for the editor, Mr. Kilburn Scott, to whose industry in restoring to a deserved niche in engineering and industrial history an almost forgotten working all recognition is due. Since Mr. Scott records that the editor of a well-known engineering journal, on being offered a centenary article on Murray exclaimed that he had never heard of him, perhaps we may without undue shame make a similar confession, but we have been enlightened by perusal of Mr. Scott's record. Murray seems to have been a type of the natural inventive genius and practical manufacturer, of whom a crop arose at that period, and did so much to make the industrial revolution in England, and many of whose names, except the great outstanding figures of Stephenson, Watt, Trevithick, Arkwright and a few others, have since sunk into comparative oblivion. Murray became a trade rival of Boulton & Watt, and there was much litigation between their respective firms, in which Murray got the worst of it, but he seems to have done his full share in advancing the design of the steam engine and other machines, some of his engines being employed on the early railways, including the Great Western. At any rate, he deserves honour in his own city of Leeds, of which he was a worthy citizen and one of the founders of its modern prosperity, and it is fitting, therefore, that this memorial fund should be widely supported in his native place.

"COME ABROAD WITH US." Written by E. P. Leigh Bennett; illustrated by Leonard Richmond, R.O.I., R.B.A. London: Published by the Southern Railway Company, price 2s. 6d. This sumptuous volume is a departure from the usual guide-book. As those responsible for its production modestly observe, it does not aspire to be more than a collection of here-and-there impressions of two innocents abroad. It is capitally done. There is originality about the letterpress that directly appeals—a subtle, indefinable charm that lures one on to reading six pages right off, when one has barely time to skim through two. This is the first time, we think, that any railway company or tourist agency has taken the whole of the popular playgrounds of Europe and put them into one book—which bears no relation to the common or garden guide-book. The work is quite beautifully illustrated. In addition to many fine full-page drawings and miniature end-and-corner pieces, the book contains numerous richly coloured sketches—artistically mounted on grey back grounds—of Dinar, Interlaken, Venice, Lake Como, the Rhine, &c. The cover is pictorially treated and highly effective. A special word of praise is due to McCorquodales, the printers, for the way in which the book as a whole has been produced: the colour-printing is particularly noteworthy and pleasing.

"HOLIDAY HAUNTS."—"Holiday Haunts," published by the Great Western Railway, has now been in existence for 24 years, and the circulation has increased fivefold in the last few years, being now 200,000 copies, which places the book first of all travel publications. This year it appears in a handsomely coloured cover. The publication gives complete information in regard to the hundreds of resorts served by the Great Western Railway, and it contains thousands of addresess of hotels, boarding houses, apartments, farmhouses, &c., as well as hundreds of photogravure illustrations. It can be obtained, price 6d.,



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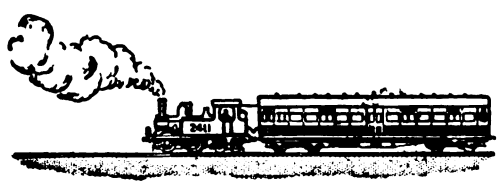
at all Great Western Railway stations, offices, agencies and bookstalls ; it can be ordered through the trade booksellers, or it will be sent to any address by the Superintendent of the Line, Great Western Railway, Paddington Station, W.2, upon application accompanied by a remittance.

THE HOLIDAY HANDBOOK, L.N.E.R.—This publication may be said to stand for the Alpha and Omega of railway holiday literature, seeing that it is No. 1 of the series and the "last word" in effective handbook advertising. It is priced at 6d., and without doubt is the best value for money now on the market. It answers the question, "Where shall I spend my summer holiday ?" in a way so convincing that few will be able to resist its appeal. Its pages are only equalled in brightness by its cover, which is of a simple but artistic design in orange, black, and gold. To many, of course, the splendid collection of photogravures of the numerous holiday resorts on the L.N.E.R. system will constitute the handbook's chiefest charm ; but we would emphasise the point that the letterpress portion of the work is extremely well done and is, in its way, equally as attractive as the other. The tinted paper and special ink used in the picture section are remarkably effective, and it is evident that very great care has been exercised in the printing. The book is conveniently sectioned. An introductory page is followed by a brief, but readable, account of the L.N.E.R. hotels ; and thereafter the work is divided into four—"Eastern Counties," "Yorkshire," "Northumberland, Durham, and the Lake District," and "Scotland." Each of these four includes a descriptive photogravure section, a list of apartments, hotels, &c., and a tinted map. In addition, there is a most useful feature in the form of town plans, inserted in appropriate places, of Aberdeen, Edinburgh, Great Yarmouth, Harrogate, Lowestoft, and Scarborough.

"OVER THE POINTS."—This is the title of a quarterly review of matters concerning the Southern Railway, written by Mr. E. P. Leigh-Bennett, the aim of which is to keep the passengers informed of the measures the company is taking to combat the many problems which confront it, "believing that some intimate glimpses into the internal mechanism of a modern railway will interest those who use the line daily." In the March issue these "intimate glimpses" include a readable account of the new Wimbledon and Sutton line, the first section of which will be opened for traffic this year. The review, which is very neatly printed and contains a number of appropriate illustrations of an "old style" character, is published, presumably gratuitously, at Waterloo station.

SOME FRIENDLY FAIRWAYS. By E. P. Leigh-Bennett.

This, it is explained in a prefatory note by the publishers, is not a golfing "handbook" or "guidebook" ; it is merely a series of delightful impressions by a distinguished writer of a number of well-known and less well-known golf courses in the south and south-west of England, and one in France. It certainly is a most entertaining work, and its many fine and artistically arranged illustrations add greatly to its general attractiveness. It is "just the thing" for the golfer who is anxious to try his hand on the "friendly fairways" so clearly and vividly described by the author. Copies may be obtained, free of charge, together with the official guidebook, "Golfing in Southern England and on the Continent" (also free), at the principal S.R. Inquiry Offices, or by post from the Indoor Commercial Manager, Southern Railway, London Bridge Station, S.E.1.



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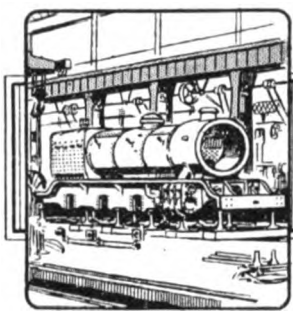

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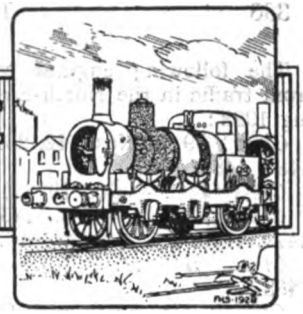

## L.M.S.R.

*Meteor*, whose name is now borne by a "Royal Scot" is No. 5318 not 5398.—[E. H. B. BROWN.]

L. & Y. engines noted at Derby include 0-6-0 No. 12112, and 0-4-0T's Nos. 11202, 11204 and 11230. L.N.W. 2-4-0 No. 5031 *Hardwicke* is now at Northampton. Information is desired as to where "Tilbury" 4-6-4T's and 0-6-2T's are now working.—[F. V. W.]

Five of the new "G3" class 0-8-0 superheater freight engines are nearing completion at Crewe, Nos. 9500-4. These engines are the first of a large order, the majority of which will be employed on this section. Further 0-6-0 standard shunting tanks have been delivered to Crewe, as follows:—Nos. 16670-4 ex-Hunslet Company, and Nos. 16730-9 ex-Beardmore & Co. Several "Princes" are now in service painted black with red lines, including Nos. 5641 and 5754. No. 13100 is the latest 2-6-0 mixed traffic engine ex-Crewe to be despatched for service on the Northern division. 0-6-2 side tank coal engines Nos. 7632 and 7789 have been fitted for motor service, the latter, in addition being supplied with vacuum control gear. Including the spare engine, which has neither number nor name, there are now only six "Engineer's" engines left, the other five being *Engineer, Crewe; Engineer, Lancaster; Engineer Liverpool; Engineer, South Wales;* and *Engineer, Watford*. These engines are all of the 6-ft. 2-4-0 straight link type. Of those engines which have been scrapped and not replaced, it is usual to fill their places with engines of the corresponding 6-ft. 6-in. class, these being "lent" as required from the nearest shed. Latest withdrawals include "Experiment" class 4-6-0 No. 5501 *Herschel* (old No. 1571) and 0-6-0 "DX" goods No. 8064 (late No. 3436). The old L.N.W. 6-ft. 2-4-0 No. 731 *Croxteth* was broken up and replaced by one of the 0-8-4 shunters (now L.M.S. No. 7936) in 1923. This would appear to correct the statement re the name *Croxteth*, which is given on p. 238 of the March issue.—[C. WILLIAMS.]

## L.N.E.R.

G.E.R. tram locomotives Nos. 7125-7127, 7129, 7135 and 7139 are at Ipswich, and No. 7128 at Yarmouth or Lowestoft. A small 0-4-0T, with cow-catcher, bell and spark arrester, but not enclosed, is at Hythe (Colchester). It is No. 7231.—[J. F. W. BOUGHTON, R. W. FITZJOHN and T. W. GRIBBLE.]

N.B. 0-6-0 No. 10146 has been scrapped, not No. 10206, as stated. The latter engine, with Class "D" No. 9021, works from Kipps, Glasgow, and has a short chimney. 0-6-2T's Nos. 2687-8 are working in Edinburgh. New 4-4-0 No. 2753, *Cheshire*, has the number on the cab side and the letters L.N.E.R. on the tender. It bears the plate "Darlington Works," 1929. 4-6-2 No. 2748 *Colorado* is at work. The frequent piloting of the down "Flying Scotsman" from Berwick to Edinburgh is to provide a return working for the engine of an afternoon meat train. The engine is often a G.N. 4-4-0. 4-6-2 No. 2749 *Flamingo* is at Carlisle.—[J. D. BLAIR.]

The new L.N.E.R. 4-6-0's are stationed as below:—No. 2802 *Walsingham* at Gorton; Nos. 2803 *Framlingham*, 2804 *Elveden*, and 2805 *Burnham Thorpe* at Parkeston, Nos. 2806 *Audley End* and 2807 *Blickling* at Ipswich, and the remainder at Stratford. New 0-6-0 (Class "J 39") No. 2720 is at Parkeston and has been observed several times working passenger trains in the Ipswich district. Other engines of this class noted at Ipswich include Nos. 2711-2 and 2714-5-6-7-8.—[T. W. GRIBBLE.]

"Super-Sentinel" car No. 51909 *Waterloo* is now at Norwich, while *Transit* is at Yarmouth.—[R. W. FITZJOHN.]

No. 10206 referred to above is now working the Garngaber branch.—[J. G. C. ANDERSON.]

No. 2748 *Colorado*, new Doncaster Pacific, came to London on February 5. Two G.N. small Atlantics are shedded at Mexboro', G.C., and work trains between Sheffield, Doncaster, Hull, Grimsby, &c.—[R. A. H. WEIGHT.]



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The following engines were withdrawn from traffic in the North-Eastern Area during 1928:

*Class* "59."—Nos. 142, 232, 506, 567, 681, 1485, 1488, 1490.

*Class* "398."—Nos. 1076, 1080, 1133, 1412.

*Class* "1463."—Nos. 1467, 1468, 1472, 1475, 1476, 1477, 1478, 1479.

*Class* "*B*" (*H. & B.*).—Nos. 2433, 2436, 2463.

*Class* "*S.*"—Nos. 2004, 2005, 2007.

*Class* "*A.*"—Nos. 187, 1584, 1605.

*Class* "*B.T.P.*"—Nos. 60, 65, 255, 341, 358, 638, 672, 949, 1019, 1020, 1055.

*Class* "124."—Nos. 193, 198, 211.

Total number withdrawn, 43.—[L.N.E.R. MAGAZINE.]

## G.W.R.

"Hall" class engines Nos. 4910, 4912, 4913 and 4915 have been noted. 4-4-0 No. 3824 *County of Cornwall* recently worked the 1.18 p.m. ex Paddington. Castle engines Nos. 4073, 4074, 4076, 4084, 4088, 5001 and 5002, also No. 4032 have been noted with "King" class tenders.—["KING EDWARD VII" J. F. BIRBY and "TINTAGEL CASTLE."]

Several instances of L.N.W.R. and G.W.R. engines together heading Manchester-Chester trains have been noted.—[R. LOCKEY.]

The following new engines have been turned out of the Swindon Works since December 3:—

Passenger 4-6-0: ("Hall" Class) No. 4901, *Adderley Hall*, No. 4902 *Aldenham Hall*, No. 4903 *Astley Hall*, No. 4904 *Binnegar Hall*, No. 4905 *Barton Hall*. Goods 2-6-2T, Nos. 5560—5564. The following new engine has been received from the North British Locomotive Co. Ltd., Glasgow: Goods 0-6-0T, No. 5725.

The following new engines have been turned out of the Swindon Works since January 9:—Passenger 4-6-0 ("Hall" class). No. 4906, *Bradfield Hall*, No. 4907, *Broughton Hall*, No. 4908, *Broome Hall*, No. 4909, *Blakesley Hall*, No. 4910, *Blaisdon Hall*, Goods 2-6-2T, Nos. 5565-5569. The following new engines have been received from the North British Locomotive Co. Ltd., Glasgow:—Goods 0-6-0T, Nos. 5700-7, Nos. 5726-9.—[G.W.R. MAGAZINE.]

No. 5135 is a further rebuilt 2-6-2T. No. 6, 2-4-0T, built in 1869 is believed to be the oldest original G.W.R. engine and is stationed at Hereford.—[A. J. C.]

Although the small 2-6-2T's are officially described as goods engines they are extensively employed in the Bristol area on suburban passenger trains, and for motor trains.—[L. B. HEWITT.]

Small 0-6-0T No. 944 *Great Mountain* was recently noted "dead" on a goods train at Oxford. No. 969, also 0-6-0T, *Seymour Clarke* has been scrapped.—[R. E. DANIELLS.]

## S.R.

4-6-0 No. E859 *Lord Hood* is now at work.—["783 SIR GILLEMERE," and "745 TINTAGEL."]

The following "E" Section locomotives have been working the 1.50 p.m. and 4.50 p.m. London Bridge-Portsmouth services:—Nos. E416, 419, 422, 424, 431 and 433. Small 4-4-0 E282 has also been seen at London Bridge (Central Section). 2-6-0's A621 and A805 have been noticed on the Western Section.—[G. T. MOODY.]

## C.L.C.

There are two trains on the Cheshire Lines which are regularly worked by Neepsend locomotives between Manchester and Liverpool. They are the 2.30 p.m. down and the 8.30 p.m. up. Locomotives working these trains include G.N. Atlantics Nos. 3272-76-80-95, 4412-20-28-33-34-49 and -51; also 4-4-0 No. 6031.—[N. PLATT.]

## M. & G.N. Joint Railway.

The 4-4-2 tank engine No. 41 is stated to be a rebuild from a Beyer, Peacock 6-ft. 4-4-0 in the RAILWAY MAGAZINE for September, 1908, and December, 1924. Nos. 9 and 20 of the same class are described as new engines in the *Locomotive Magazine* for September, 1910. The 4-4-0 tanks replaced by the latter engines were placed on the duplicate list, No. 9A working the Mundesley-on-Sea line in 1923 as already mentioned, while in "Locomotive Notes" for October, last, No. 9A is stated to be stationed at Yarmouth and No. 20A at Melton Constable. The 4-4-0 tank *North Walsham* was scrapped in 1904 (see *Locomotive Magazine*, September, 1921). The saddle tank No. 16A was built in 1877 for the Great Yarmouth and Stalham Light Railway. The Joint Committee dates only from 1893.—[G. T. MOODY.]

Letters have also been received from "Niagara," "Sir Constantine," R. A. Valentin, "Claud 8810," R. N. Oldrey, E. J. Norris, "6017 Breadalbane," C. M. Furst, J. H. Aston, R. A. Lister, K. Davison, J. L. Sutcliffe, C. L. Jamblin, C. R. Prescott, R. A. Read and "C.J. 17435."

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THE RAILWAY MAGAZINE.]

## THREE-CYLINDER 0-8-0 TANK ENGINE, SOUTHERN RAILWAY.

**Designed by Mr. R. E. L. Maunsell, C.B.E., Chief Mechanical Engineer.**

**Cylinders (3) 16in. × 28in. Coupled Wheels 4ft. 8in. Weight in Working Order 71 tons 12 cwts.**

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# Express Train Running in Switzerland.

By J. P. PEARSON.

*Photo.*] [*A. J. Blanchet.*

**2-4-0 + 0-4-2 ST. GOTHARD ELECTRIC LOCOMOTIVE AT GOESCHENEN.**

NOT very long ago Mr. C. J. Allen, in one of his ever-welcome monthly articles on "British Locomotive Practice and Performance," deplored that the lead in express train running had passed from Great Britain and the Great Western Railway, which had for so long worthily held this primacy, to the Northern Railway of France. It is true that the Northern had not surpassed, nor even equalled, our own line in the matter of high downhill speeds, but the primacy is not awarded for this qualification. High speeds uphill, with heavy loads, are the determining factor, and it was in this respect that the work of the Northern of France shone with such lustre.

Adopting this criterion as to what constitutes the finest class of express work, it will, I think, come as a surprise to those of your readers interested in such matters, to be informed that there is in Europe express uphill work, with the heaviest loads, in daily performance, which surpasses, in my opinion, the finest efforts of the Nord. This work is done by electric motors, on the Swiss Federal Railways. During a great part of the month of September, 1927, I was engaged in noting this work, my experiences being chiefly concerned with performances on grades of 12, 16 and 25 to 27 per 1,000, or, in other words, 1 in 83, 1 in 62, and 1 in 40 to 1 in 37. I will now give the best of such performances—it would be impossible in the limits of a short article to give them all. As regards the computation of loads given below, these were all most carefully ascertained by reading them off from the framing of each vehicle. These, totalled, have had 7 per cent. added to them for weight of passengers, luggage and stores. Weight of the electric motor is in no case included.

On the Basel to Zürich line the water-parting between the rivers Rhine and Aar is crossed between the stations of Brugg and Stein, the highest point being the tunnel near Effingen. Leading up to this from the eastern (or Brugg) side is a grade of 7,423 metres (about 4½ miles) at 1 in 83. This is unbroken, and, as all trains either stop at Brugg or slack very severely through that station, the bank, which starts within the town, is approached at slow speed, and impetus does not help the ascent. Nevertheless on this grade of 1 in 83, electric motor 10615, with a load of 424 tons, did the last four kilometres in 58, 57, 54 and 53 seconds, thus accelerating to a speed of 42½ m.p.h. on this steep rise with this heavy load. Even better, with 405 tons, was the work of motor 10439, which managed these last four kilometres in 50, 51, 50 and 51 seconds, or at the rate of 44¼ m.p.h. Needless, to say, nowhere in England is such work performed.

Coming from the west (or Stein)



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direction, the bank is, on the whole, more severe because longer. From Stein to Effingen is some 17 km., but the earlier part of the ascent, though with much at 1 in 100 and 1 in 83, is broken by level bits, and therefore only the final 8 or 9 km. need concern us. This is made up of 4,440 m. at 1 in 83, a short bit of 333 m. level, and then come 3,958 m. at 1 in 83, or, in other words, a 5¼-mile bank with a short rest about half way. With electric motor 10901 and a load of 475 tons we were slacked very severely at the foot of the 4,440 m., and then, in the short space of this gradient, we recovered to do our last kilometre in 57 sec. Slacked again on the level strip, we again recovered to do the last kilometre of the 3,958 in 57 sec. again, or all but 40 m.p.h., with 475 tons on 1 in 83. The same motor, with the same load, on another occasion, slacked at the foot of the 4,440-m. bit, as before, but not on the level bit, accelerated until the final kilometre only took 55 sec., or 41 m.p.h. I fear there is no steam locomotive doing work like this.

Coming now to the steeper grade of 1 in 62, or 16 in 1,000, my two best records were taken on the ascent from Emmenbrücke to Rothenburg, on the Lucerne to Olten line. Impetus here again played no part in the ascent, as in one case we slacked very severely through Emmenbrücke, and in the other we stopped there. Slacking, with motor 10437 and 385 tons, we accelerated steadily up the 1 in 62 until our last kilometre took 64 sec., while on the occasion when we stopped in Emmenbrücke, motor 10458 with 394 tons, did even better by managing the final kilometre in 59 sec., or over 38 m.p.h. on 1 in 62 with this heavy load.

A very favourite grade in Switzerland is that of from 25 to 27 in the 1,000, or 1 in 40 to 1 in 38, and these we find in plenty—

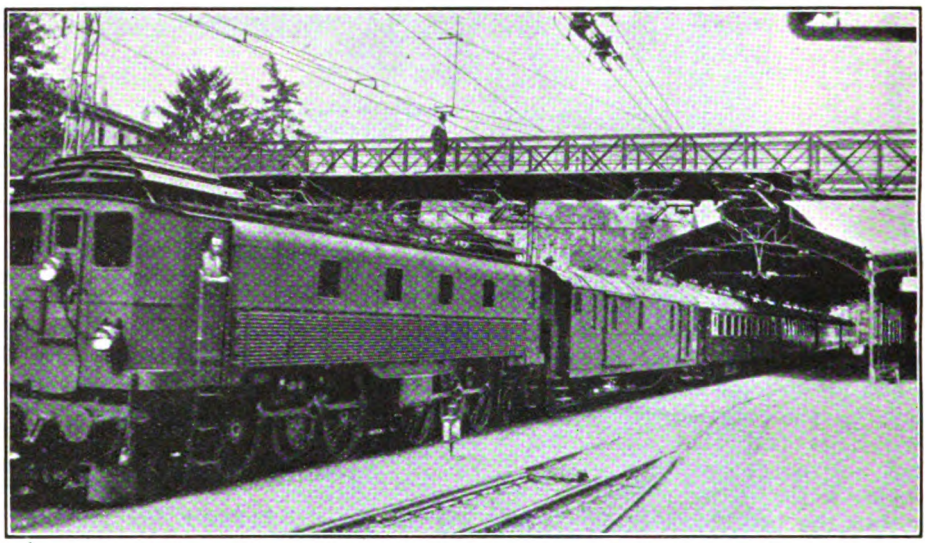

*Photo.*] [*A. F. King-Stephenson.*

**ST. GOTHARD PULLMAN EXPRESS FROM BÂLE, AT LUGANO STATION.**

a sort of Lickey incline on a grand scale—on the Lötschberg and Gothard main routes. We will take the former first.

Ascending from the north, we find that the vertical rise in the 18·1 km. from Frutigen to Kandersteg is 396 m. This is something like 1 in 45 the whole way. So, allowing for the short easy bits at the stations, we shall not be surprised at a prevalence of grades at 27 in the 1,000 (or 1 in 37) intermediately. On such grades I have records of kilometres in 57 and 58 sec. (motor 158 and 230 tons), and in 65 and 66 sec. (motor 153 and 302 tons). These results, be it remembered, were obtained without the help of impetus, being from the start at Frutigen. Our own South Devon grades of this category

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being short, lend themselves to being crossed in some considerable degree by the help of the " velocity-head " stored in the train approaching them.

Coming from the Rhone Valley, the rise from Brig to Goppenstein averages 1 in 47 for the whole distance of 15¾ miles (25·4 km.). Here, again, we have grades of 1 in 37, and on these, right at the top of the bank, between Hothen and Goppenstein, electric motor 156 with 218 tons was doing kilometres in 63 sec. A still better performance was achieved by motor No. 162, with 204 tons. This stiffens to 1 in 40. Consequently, grades of 1 in 37 abound as on the Lötschberg. With two electric motors (12505 and another) and a huge train of 535 tons, we ran up these gradients at from 62 to 64 sec. to the kilometre. On another occasion, with two electric motors and 523 tons, we improved on this by doing kilometre after kilometre in 59, 60 and 61 sec., and ran the whole distance of all but 18 miles from Erstfeld to Göschenen, start-to-stop, in 28 min. 44 sec. Then with motors 12505 and 12328, and the truly stupendous load of exactly 600 tons

*Photo.*] [*B. Lorenz.*

**ELECTRIC TRAIN ON DAVOS LINE.**

machine succeeded in doing its final kilometres in 55 and 56 sec. each, or at the rate of 41 miles an hour, on a gradient of 1 in 37, with a fair load. Impetus again had nothing to do with the wonderful results obtained here.

Perhaps the finest work of all, however, is found on the Gothard main route, ascending from Erstfeld to Göschenen, going south, and from Biasca to Airolo in the reverse direction. Here the trains are so heavy that almost invariably two electric motors head the train. The climb is just as long sustained, and the gradients just as terribly severe as on the Lötschberg. From Amsteg to Göschenen is 14¾ miles, at an average of 1 in 42, while from Amsteg to Gurtnellen the average we traversed this distance, start-to-stop in 30 min. 48 sec. (booked in 37), and covered the kilometres on the worst part of the bank in 63, 64, 67, 68 and 70 sec., while they were reeled off in 60 to 62 sec. where the rise was only 1 in 44.

Returning, we find that the line rises, after an ascent (moderate by comparison) out of Biasca to Bodio, in a distance of 24½ miles from the latter point to Airolo, no less than 811 m., or at an average of 1 in 48. Generally speaking, however, the averages between stations are distinctly harder than this (1 in 42, 44 and 45), the over-all average as between Bodio and Airolo being affected by an easy bit between Rodi-Fiesso and Ambri-Piotta. Thus we have again gradients ranging up



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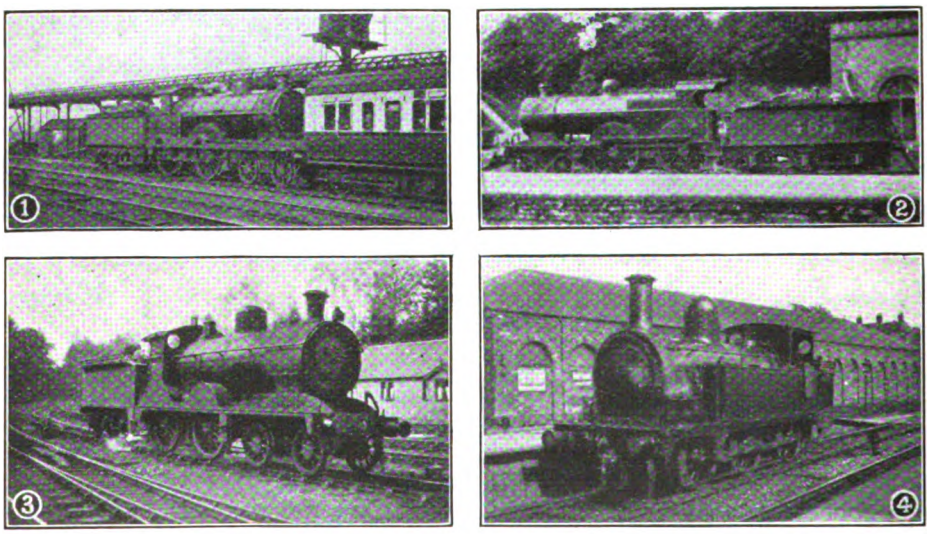
to 1 in 37, and the last 5 km. of the bank (4,970 m.) are all at 1 in 40. With 433 tons and two electric motors (14304 and another), we managed kilometres up the 1 in 37 in 63 and 64 sec. and three at the top, on the 1 in 40, in 60 sec. each. Still finer, on the 1 in 37, was the work of motors 12504 and 14304, which, with 476 tons, traversed the 1 in 37 in 61 and 62 sec., and did 3 km. at the top in 57 sec. each. Then, with 12323 and 14304, and the huge load of 503 tons, we, although not doing so well on the 1 in 37, yet managed to cover the closing kilometres at 1 in 40 in the remarkably good figures of 63 and 64 sec. Finally, with motors 12323 and another, and 459 tons, we only took 61 and 62 sec. on the 1 in 37, and finished grandly on the 4970 m. approaching Airolo in 55, 56, 57 and 59 sec. per kilometre. On this occasion we ran, start-to-stop, from Biasca to Airolo, 28⅓ miles, in 43 min. 44 sec., while with the run above, with 433 tons, our time was 43 min. 36 sec., or all but 40 m.p.h. throughout, with these extremely heavy loads and on gradients of the most severe character. Such records speak for themselves—they are too remarkable to need further comment.

## SNAPSHOTS ON THE L.M.S.R.




*Photos.*] [*L. Vickerstaff.*

1. L.N.W. No. 5219 "PSYCHE" SHUNTING AT CREWE.

2. MID. 4-4-0 No. 483 AT LAKESIDE.

3. FURNESS 4-4-0 No. 10187 AT LAKESIDE.

4. N.S. 0-6-0T No. 1597 AT LEEK.

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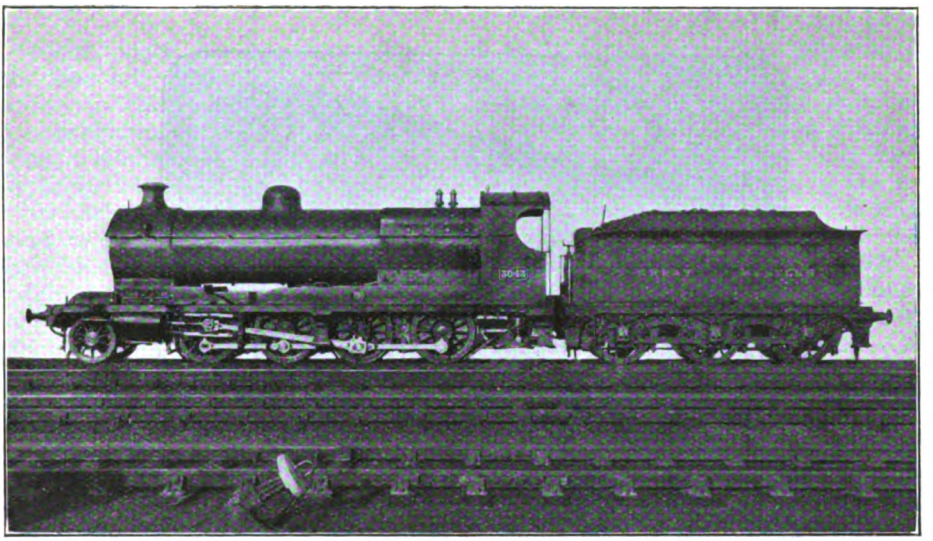

2-8-0 "R.O.D." CLASS LOCOMOTIVE No. 3043.

# Modern Locomotive Practice on the Great Western Railway. [No. XIV.]

By F. W. BREWER, A.I.Loco.E.

TWENTY 2-8-0's, of the well-known G.C.R. "R.O.D." tender type, were purchased from the Government by the G.W.R. Company in 1919, and were numbered 3000–3019. These engines had slightly inclined outside cylinders, 21 in. by 26 in., and 4 ft. 8 in. coupled wheels. The pistons were provided with tail-rods, the only other engines on the line which had previously had such rods having been the two larger of the de Glehn compounds, Nos. 103 and 104. No engine designed and constructed by the G.W.R. has ever had them. The steam pressure of the "R.O.D.'s" being 180 lb., the tractive force was 32,200 lb. As then equipped with 22-element superheaters, the boilers (length of barrel 15 ft.; maximum diameter, 5 ft.) had a combined heating surface of 1,756 sq. ft., of which 255 sq. ft. belonged to the superheater, while the grate area was 26·25 sq. ft. The weight of the engines, with 67¾ tons available for adhesion, was 74 tons 7 cwt., and that of the tenders, 44 tons 14 cwt.; total, 122 tons 1 cwt.

In 1923, a beginning was made with the fitting of this initial series with Swindon superheaters, and with the top-feed device, the latter being disposed between the dome and the chimney. After being thus modified, the engines had 225·12 sq. ft. of superheating surface, and a total heating surface of 1,816·50 sq. ft.; grate area, 26·07 sq. ft. The safety-valves, of the Ross pattern, and previously without a cover, were enclosed within a brass casing. A slight reduction occurred in the weight of the engines, the total being 73 tons 11 cwt., with 66 tons 8 cwt. on the coupled wheels.

Eighty additional "R.O.D.'s" were procured in August, 1925, and these were numbered 3020–3099. Of this lot, No. 3067 was cut up in 1927, leaving, at the end of that year, 99 engines of this class in service.

Mr. G. J. Churchward retired in 1922 and was succeeded by Mr. C. B. Collett, who in 1919 had been made Deputy Chief Mechanical Engineer, having previously held the position of Works Manager at Swindon.

It is almost supererogatory to say that



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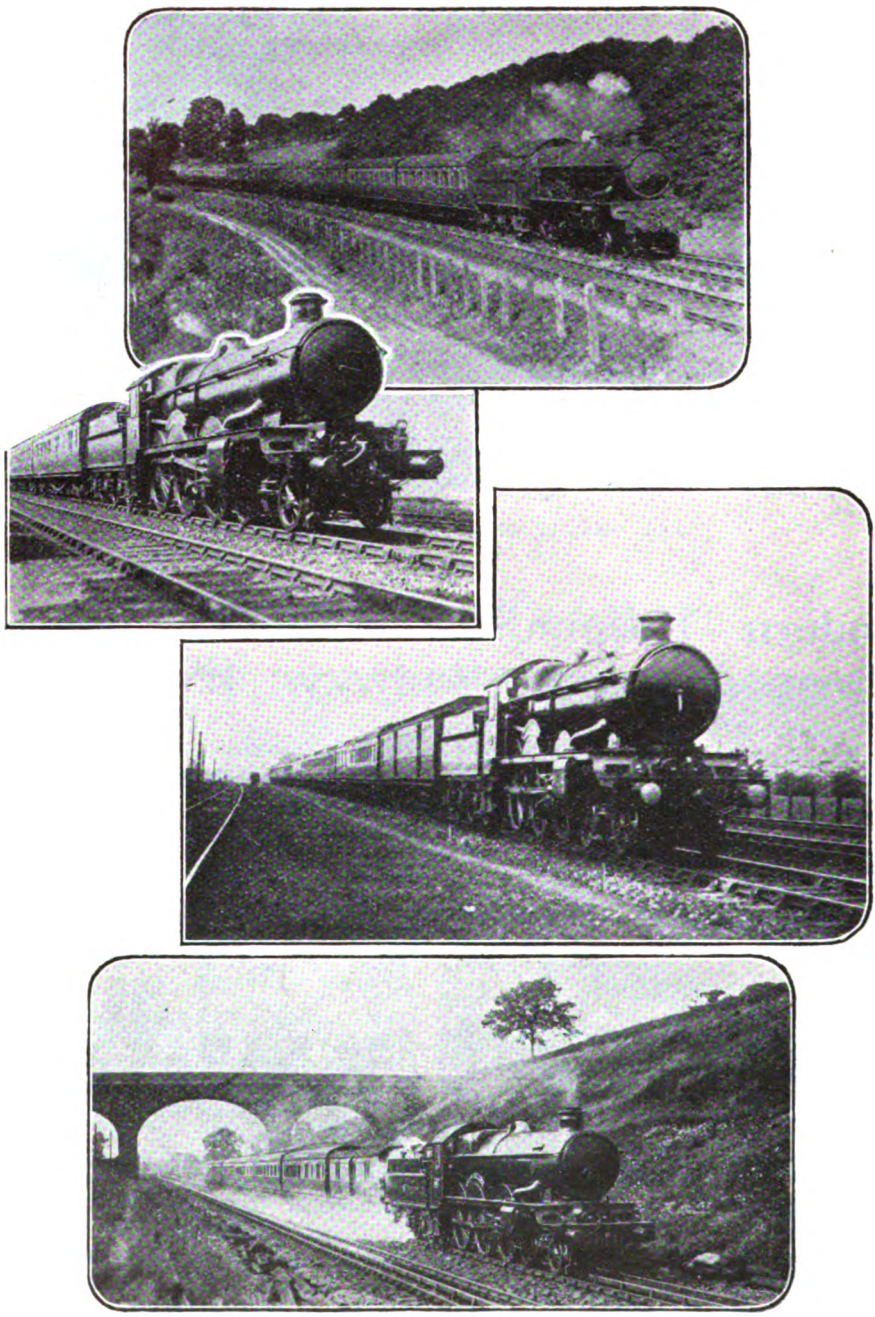

1.—No. 5012 "BERRY POMEROY CASTLE" AT CULLOMPTON. *Photo. S. A. Molesworth.*

2.—No. 4096 "HIGHCLERE CASTLE" ON LONDON EXPRESS. *Photo. P. Ransome Wallis.*

3.—No. 4073 "CAERPHILLY CASTLE" NEAR WEST DRAYTON. *Photo. Henry L. Salmon.*

4.—No. 5005 "MANORBIER CASTLE" ON ABERYSTWYTH-LONDON EXPRESS. *Photo. H. Gordon Tidey.*

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Mr. Collett, since his appointment as C.M.E., has fully upheld Great Western traditions in the matter of locomotive design and efficiency. In 1923, he brought out his celebrated "Castle" class of four-cylinder 4-6-0's, and four years later he built the first of his super-pressure express engines, the still more famous "Kings," each class representing an appreciable advance on preceding engines of the same type. Differ as some people do as to the relative merits of three-crank and four-crank locomotives, there is no gainsaying the fact that the G.W.R. four-cylinder engines have proved themselves to be outstandingly successful, and, for all-round excellence as regards speed, weight-pulling, and economy, they have long occupied a foremost position in the ranks of conventional steam locomotives of the highest class.

The tractive force has been progressively augmented, from 25,085 lb. in the original "Stars," to 27,800 lb. in the later series; and in turn increased to 31,265 lb. in the "Castles," and 40,300 lb. (equivalent to a draw-bar pull of virtually 18 tons) in the new high-pressure "Kings." The power of the latter exceeds that of any other British express engine so far built.

As enlargements of the more recently built "Stars," the "Castles" have 16-in. instead of 15-in. by 26-in. cylinders, and bigger boilers, the latter having a maximum diameter of 5 ft. 9 in., as against one of 5 ft. 6 in., the length of the barrel remaining 14 ft. 10 in. The combined heating surface (superheating steam tube surface, 262·62 sq. ft., as in the "Abbeys") is 2,312·0 sq. ft. and the grate area, 30·28 sq. ft. The weight of the "Castles" is 79 tons 17 cwt., of which total 58 tons 17 cwt. rest jointly on the coupled wheels.

From 1923 to 1927, 40 engines named after castles and numbered 4073–5012, were constructed at Swindon. These formed the "Castle" class proper. All the engines had six-coupled wheels 6 ft. 8½ in. in diameter. An odd engine, No. 111, formerly the 4-6-2 *The Great Bear*, was added to the same 4-6-0 class in 1924, having been then reconstructed as a "Castle" and re-named *Viscount Churchill*. Further, down to the end of 1927, four of the "Stars," as previously notified, had been similarly converted, and others of the "Star" series will follow in due course.

The "Castles" are fitted with large side-windowed cabs furnished with seats for the driver and fireman, and having vertical handrails extending to the roof. Most of the engines were originally supplied with 40-ton tenders of 3,500 gallons water capacity, but in 1926 enlarged tenders holding 4,000 gallons of water, and weighing 46 tons 14 cwt., with 6 tons of coal, began to be provided. These new tenders have higher sides, and are of the self-feeding type (the inner portion being sloped towards the middle, so that the coal falls by gravity within easy reach of the fireman) and they are, of course, equipped with the standard water pick-up apparatus.

Three special dynamometer test runs were made with No. 4074 *Caldicot Castle* in March, 1924. Each test consisted of a run from Swindon to Plymouth and back, the up journey being made on the following day. The dates on which the trials were carried out were March 14 and 15; 19 and 20; and 25 and 26. In the down direction, the load each day comprised 14 70-ft. bogie carriages and the dynamometer car from Swindon to Taunton, 11 coaches and the car from Taunton to Newton Abbot, and eight and the car from the latter place to Plymouth. The up journey trains each consisted of eight carriages and the car *ex* Plymouth to Newton Abbot, and 14 and the car thence to Swindon. The down journeys were accomplished *via* the Badminton and Bristol relief line, and the up runs *via* the Bristol relief line and Box. Briefly, the timing was as under:—

| Down. | arr. | dep. |
|---|---|---|
| Swindon .. | | 9.45 |
| Pylle Hill Junction | | 10.31 |
| Taunton .. | 11.20 | 11.25 |
| Newton Abbot .. | 12.24 | 12.29 |
| Plymouth | 1.15 | |

| Up. | arr. | dep. |
|---|---|---|
| Plymouth | | 9.15 |
| Newton Abbot.. | 10.1 | 10.7 |
| Exeter, pass | 10.32 | |
| Taunton, pass .. | 11.6 | |
| Swindon.. | 12.53 | |

The results of the tests on March 19 and 20 showed the coal consumption to have been 2·10 lb. per I.H.P. and 2·83 lb. per drawbar H.P., while the water evaporated per lb. of coal and per drawbar H.P., was, respectively, 12·2 lb. and 28·1 lb. The maximum drawbar pull at 71



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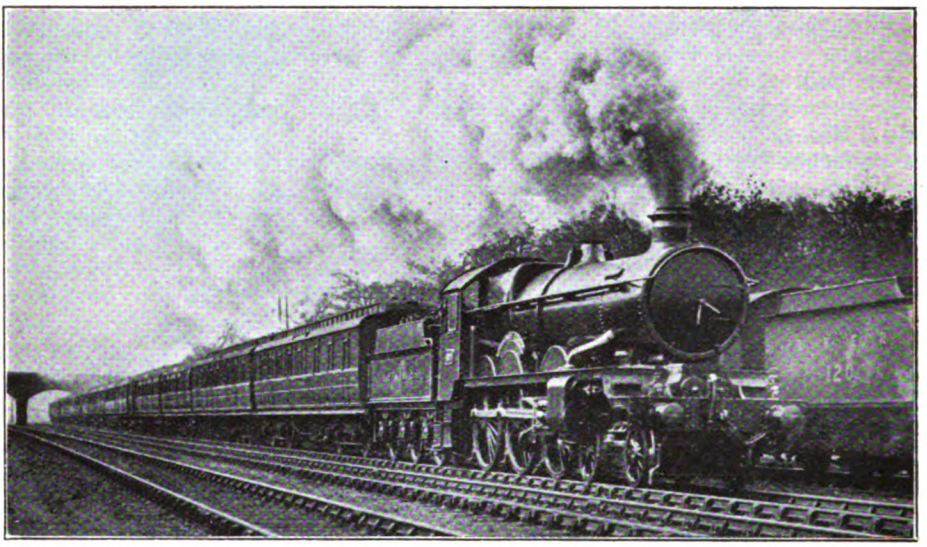

*Photo.*] [*F. R. Hebron.*

**G.W.R. No. 4079 "PENDENNIS CASTLE" ON LEEDS AND BRADFORD EXPRESS, L.N.E.R.**

*Photo.*] [*H. Gordon Tidey.*

**L.N.E.R. No. 4474 ON "CORNISH RIVIERA" EXPRESS, G.W.R.**

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m.p.h. was 2·35 tons. All of these results were remarkably good, and they served still further to demonstrate the very high standard of locomotive practice on the G.W.R.

Very interesting and distinctly important also were the trials which took place in 1925 between Mr. Collett's "Castle" class express engines of the G.W.R., and Mr. Gresley's three-cylinder "Pacifics," or 4-6-2's of the L. & N.E.R. Mr. Collett transferred to the latter line No. 4079, *Pendennis Castle*, on which line it worked in competition with one of the 4-6-2's, No. 2545. In return, the L. & N.E.R. lent for trial on the G.W.R., Pacific No. 4474, and this ran in turn with No. 4074, *Caldicot Castle*, the engine concerned in the dynamometer tests just cited. As a rival to *Pendennis Castle* on the L. & N.E.R. Mr. Gresley had selected Pacific No. 4475, but the latter failed at Corby on the first day of the trials, and thereafter No. 2545 ran in her place.

After five days' preliminary running, April 20-24, the trials themselves began on April 27 and ended on May 2. The trains then worked by *Pendennis Castle* on the L. & N.E.R. were:

| Down. | Up. |
|---|---|
| 10.10 a.m. ex King's Cross | 3.7 p.m. ex Grantham |
| 1.30 p.m. ex King's Cross | 6.21 p.m. ex Doncaster |

The down, and the corresponding up trains, the weight of which averaged 458 tons, were run on alternate days, in turn with the L. & N.E.R. Pacific No. 2545, except on April 27, when the 4-6-2 originally chosen, No. 4475, on the 1.30 p.m., "broke down" at Corby owing to a hot box, and was thereupon withdrawn from the tests. For the purposes of the trials, this run was held to be void, and in order to balance matters, the run by *Pendennis Castle* on the following day was also ignored.

On the G.W.R., the trains hauled by the L. & N.E.R. 4-6-2 No. 4474 were the 10.30 a.m. down Cornish Riviera non-stop express to Plymouth, and (on the succeeding day) the 12.30 p.m. up from Plymouth, with a stop at Exeter. The down journey loads were approximately 499 tons to Westbury; 427 thence to Taunton; 360 Taunton to Exeter; and 292 tons on to Plymouth. On the return trips, the trains weighed about 292 tons from Plymouth to Exeter, and 324 tons for the non-stop run from Exeter to Paddington. The G.W.R. engine competing against No. 4474 on these trains was *Caldicot Castle*, as previously mentioned.

To discuss these trials in anything like detail would occupy too much space at the present time. A few comments on the general character of the efforts achieved by the rival locomotives are, however, necessary.

On the G.W.R., Mr. Gresley's Pacific, No. 4474, working on a strange or "foreign" line, accomplished, it must be admitted, very good results indeed. She was never late in arriving either at Plymouth or at Paddington, and on four occasions she was slightly before time—on April 30, on the up train, as much as 2 min. As might have been expected, and reasonably so, *Caldicot Castle*, running on her own road, acquitted herself with distinction. She was always well-ahead of time. Two of her performances stand out with especial prominence. When working the first up train, on April 27, she averaged 64 m.p.h. from Exeter, and reached Paddington 15 min. early. Again, on May 2 (the last day) she ran the down Cornish Riviera also in 15 min. under the booked allowance, and covered the 173¾ miles to Exeter at a mean rate of 62 m.p.h.

The Great Western engine working on the L. & N.E.R., the *Pendennis Castle*, had no difficulty in tackling the tasks allotted to her. Generally speaking, she arrived at her respective destinations with two or three minutes in hand. But, for some inexplicable reason (inexplicable except on April 28, when something went wrong with the steam sanding gear, causing the engine to lose time through slipping badly on the incline from Belle Isle to Holloway) the competing engine, the L. & N.E.R. Pacific, No. 2545, did not do so well as she ought to have done, and as a rule, apart from station delays, she exceeded her time allowance.

The net result of the trials may be stated in this way. The G.W.R. engine, No. 4079, weighing 79 tons 17 cwts. (omitting the tender) showed that she could do all and more than was required of her on the L. & N.E.R., but this fact was in no sense surprising seeing what her

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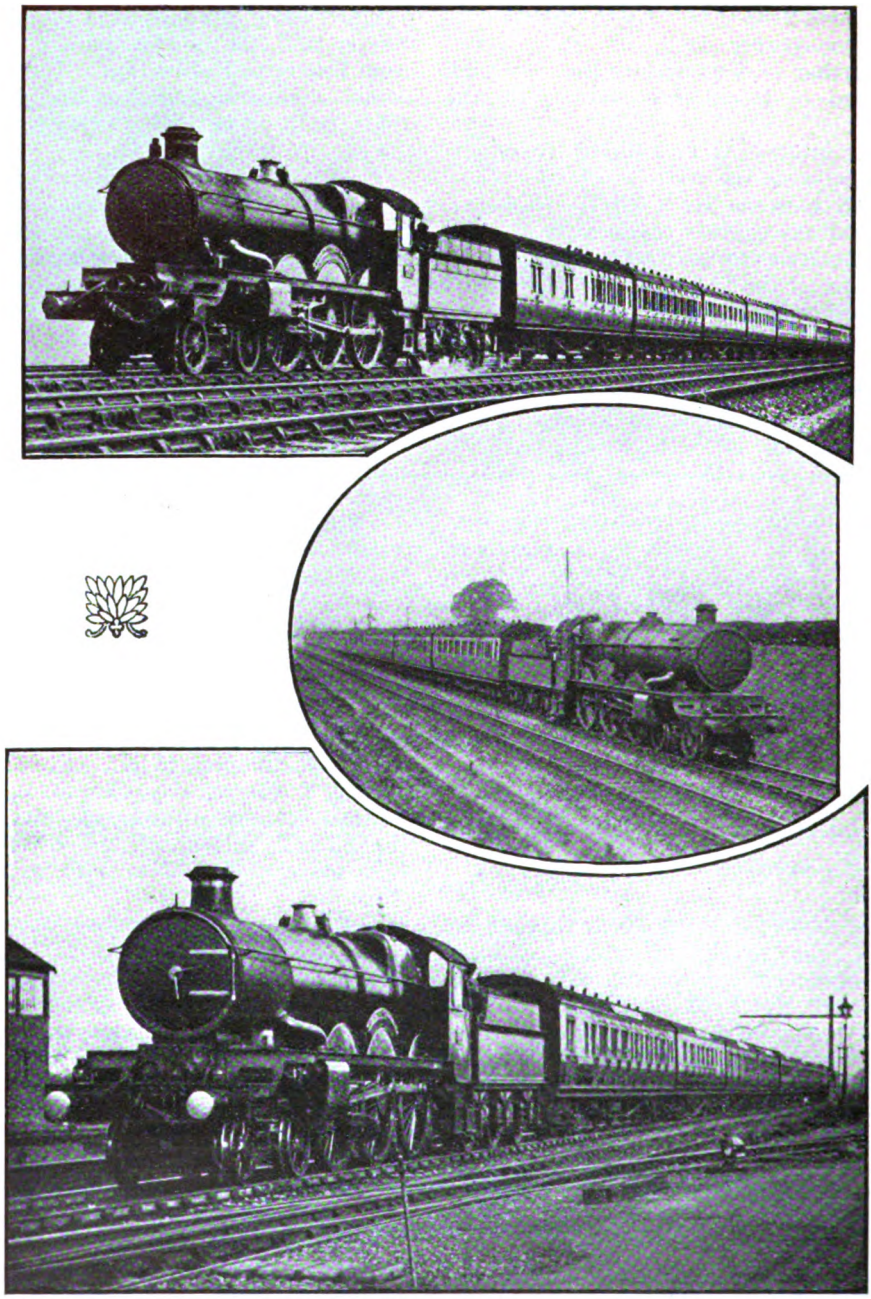

1. **DOWN STOPPING TRAIN, No. 4016 "KNIGHT OF THE GOLDEN FLEECE," REBUILT TO "CASTLE" CLASS.** *Photo. M. W. Earley.*

2. **UP TRAIN NEAR NEWBURY, No. 4032 "QUEEN ALEXANDRA," REBUILT TO "CASTLE" CLASS.** *Photo. A. Halls.*

3. **DOWN CHELTENHAM EXPRESS, No. 111 "VISCOUNT CHURCHILL."** *Photo. M. W. Earley.*

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sister engines daily accomplished on the G.W.R. The L. & N.E.R. Pacific, No. 2545, weighing (exclusive of the tender) 92 tons 9 cwts., could ostensibly have given a better account of herself than was the case, having regard to the performance by the similar 4-6-2, No. 4474, on the G.W.R.

Nevertheless, the point emerges that the G.W.R. "Castles" are, for their size and weight, exceptionally efficient and economical engines, further corroboration of which fact was forthcoming some seventeen months later, when, in 1926, No. 5000 *Launceston Castle*, worked on the L.M. & S.R., between Euston and Crewe from October 18 to 30, and between Crewe and Carlisle from November 1 to 13. No official data of the latter tests have transpired, but some particulars of the working of No. 5000 on the L.M. & S.R. were given by Mr. C. J. Allen in the RAILWAY MAGAZINE.

In the G.W. and L. & N.E. trials, the coal consumption per mile for each engine averaged as follows:—On the G.W.R., No. 4074, *Caldicot Castle*, 41·9 lb.; Pacific No. 4474, 47·9 lb. On the L. & N.E.R.: No. 4079 *Pendennis Castle*, 53·4 lb.; Pacific No. 2545, 57·1 lb.

The L. & N.E. Pacifics had three 20-in. by 26-in. cylinders and 180 lb. pressure, as against four 16-in. by 26-in. cylinders and 225 lb. pressure in the case of the G.W.R. "Castle" class 4-6-0's. The coupled wheels in each type were practically of the same size, the G.W. engines having a divided drive and the L. & N.E. engines a single drive. The chief difference between the 4-6-0's and the 4-6-2's lay in their boilers, those of the "Castles" being smaller than those of the Pacifics. Hence, the question arose as to whether *Pendennis Castle* could maintain a sufficiently good head of steam to do her work on the L. & N.E.R., and although this question might be taken to have been already settled by the achievements of the "Castles" on the G.W.R., it was finally disposed of by the actual running of the *Pendennis Castle* on the competing line. At 85 per cent. of the boiler pressure, the tractive effort of the "Castles" was 31,625 lb., and that of the Pacifics 29,835 lb.

When, some time after the conclusion of the trials of 1925, the naming of the L. & N.E.R. Pacifics became general (four only having been previously named), the titles allotted to the three 4-6-2's concerned were:—

| | |
|---|---|
| No. 4474 .. .. | *Victor Wild* |
| No. 4475 .. .. | *Flying Fox.* |
| No. 2545 .. .. | *Diamond Jubilee.* |

All three engines were built at Doncaster, Nos. 4474 and 4475 in March and April 1923, respectively, and No. 2545 in August 1924.

Accompanying, is a list of the G.W.R. "Castle" class 4-6-0's, with their present names. In the case of six of the engines, Nos. 5004—5007, and Nos. 5010 and 5012, the names originally selected were changed.

G.W.R.
List of Four-Cylinder 4-6-0 Express Engines.
"Castle" Class.

| No. | Name. | Year Built. |
|---|---|---|
| 5004 | *Manorbier Castle* .. .. | — |
| 5005 | *Newport Castle* .. .. | — |
| 5006 | *Ogmore Castle* .. .. .. | — |
| 5007 | *Oystermouth Castle* .. .. | — |
| 5010 | *Swansea Castle* .. .. .. | — |
| 5012 | *Wallingford Castle* .. .. | — |
| 4073 | *Caerphilly Castle* .. .. | 1923 |
| 4074 | *Caldicot Castle* .. .. | ,, |
| 4075 | *Cardiff Castle* .. .. .. | 1924 |
| 4076 | *Carmarthen Castle* .. .. | ,, |
| 4077 | *Chepstow Castle* .. .. | ,, |
| 4078 | *Pembroke Castle* .. .. | ,, |
| 4079 | *Pendennis Castle* .. .. | ,, |
| 4080 | *Powderham Castle* .. .. | ,, |
| 4081 | *Warwick Castle* .. .. | ,, |
| 4082 | *Windsor Castle* .. .. | ,, |
| 4083 | *Abbotsbury Castle* .. .. | 1925 |
| 4084 | *Aberystwith Castle* .. .. | ,, |
| 4085 | *Berkeley Castle* .. .. | ,, |
| 4086 | *Builth Castle* .. .. .. | ,, |
| 4087 | *Cardigan Castle* .. .. | ,, |
| 4088 | *Dartmouth Castle* .. .. | ,, |
| 4089 | *Donnington Castle* .. .. | ,, |
| 4090 | *Dorchester Castle* .. .. | ,, |
| 4091 | *Dudley Castle* .. .. | ,, |
| 4092 | *Dunraven Castle* .. .. | ,, |
| 4093 | *Dunster Castle* .. .. .. | 1926 |
| 4094 | *Dynevor Castle* .. .. | ,, |
| 4095 | *Harlech Castle* .. .. .. | ,, |
| 4096 | *Highclere Castle* .. .. | ,, |
| 4097 | *Kenilworth Castle* .. .. | ,, |
| 4098 | *Kidwelly Castle* .. .. | ,, |
| 4099 | *Kilgerran Castle* .. .. | ,, |
| 5000 | *Launceston Castle* .. .. | ,, |
| 5001 | *Llandovery Castle* .. .. | ,, |
| 5002 | *Ludlow Castle* .. .. | ,, |
| 5003 | *Lulworth Castle* .. .. | 1927 |
| 5004 | *Llanstephan Castle* .. .. | ,, |
| 5005 | *Manorbier Castle* .. .. | ,, |
| 5006 | *Tregenna Castle* .. .. | ,, |
| 5007 | *Rougemont Castle* .. .. | ,, |
| 5008 | *Raglan Castle* .. .. | ,, |

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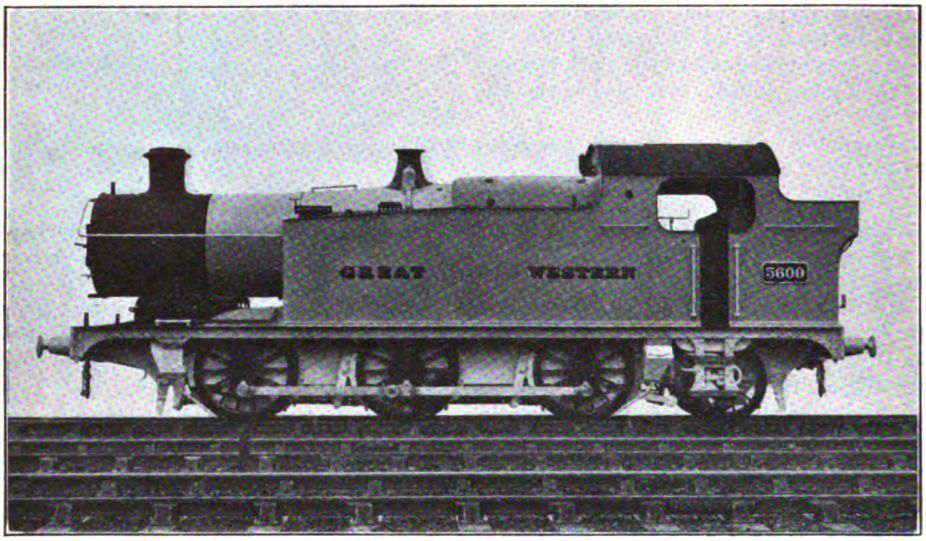


0-6-2 TANK ENGINE No. 5600.

*Photo.*] [*A. Halls.*

0-6-2 TANK ENGINE No. 5685 ON CARDIFF-BARRY TRAIN.

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| No. | Name. | Year Built. |
|---|---|---|
| 5009 | *Shrewsbury Castle* .. .. | 1927. |
| 5010 | *Restormel Castle* .. .. | ,, |
| 5011 | *Tintagel Castle* .. .. | ,, |
| 5012 | *Berry Pomeroy Castle* .. .. | ,, |
| 111 | *Viscount Churchill** .. .. | 1924 |

* Formerly 4-6-2 *The Great Bear*, converted to 4-6-0 in 1924.

One of the " Castles," No. 4082 *Windsor Castle*, is especially famous on account of its having been the engine which His Majesty King George V drove from Swindon Works to the station on April 28, 1924, on the occasion of the visit to these works of His Majesty and Queen Mary. On the footplate, in addition to the King and Queen, were Viscount Churchill (Chairman), Sir Felix Pole (General Manager), Mr. C. B. Collett (Chief Mechanical Engineer), Mr. G. H. Flewellen (Locomotive Inspector), and driver E. R. B. Rowe and fireman A. W. Cook.

In 1924, Mr. Collett adopted the 0-6-2 type of tank engines for dealing with coal and goods trains in the South Wales area. This type was then new to the G.W.R. itself, although it was in use on some of the lines absorbed under the grouping scheme, such as the Taff Vale, Barry, and Rhymney. It was first brought out on the L. & Y.R. in 1881, by Mr. Barton Wright. Engines of the same type were also designed in 1881 for the L. & N.W.R. by Mr. F. W. Webb. The type is now a very popular one.

Mr. Collett's 0-6-2T's had 18-in. by 26-in. inside cylinders, 4-ft. 7½-in. coupled wheels, and 3-ft. 8-in. radial wheels. Compensating levers were not employed in these engines. The boiler was of the non-domed taper pattern with an extended smokebox resting on a saddle.

The length of the boiler barrel was 11 ft., and the maximum diameter outside 5 ft. 0½ in. Including that of the superheater and Belpaire firebox, the heating surface was 1,348·95 sq. ft., while the grate area was 20·35 sq. ft., and the steam pressure 200 lb. per sq. in.

The nominal tractive force amounted to 25,800 lb. In running condition, the engines, which had a tank capacity of 1,900 gallons, weighed 68 tons 12 cwt., and had 55 tons 12 cwt. on the coupled wheels. Four of these 0-6-2T's were turned out at Swindon in 1924, and were numbered 5600-5603. In 1925, forty-six more were built, and the construction of this class was continued in 1926, 1927, and 1928. The numbers run consecutively down to 5699, but after that a fresh series commenced with No. 6600, and continues, at the time of writing, down to No. 6649. These various batches were completed as undernoted :—

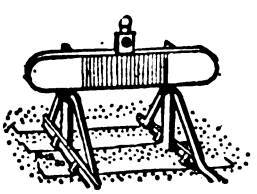
G.W.R.

List of 4-ft. 7½-in. 0-6-2 Goods Tank Engines.

| No. | Year Built. |
|---|---|
| 5600–5603 .. .. .. | 1924 |
| 5604–5649 .. .. .. | 1925 |
| 5650–5684 .. .. .. | 1926 |
| 5685–5699 .. .. .. | 1927 |
| 6600–6618 .. .. .. | 1927 |
| 6619–6649 .. .. .. | 1928 |

It will be remembered that 50 tank engines of this 0-6-2 type were ordered to be built to Mr. Collett's designs by Sir W. G. Armstrong, Whitworth & Co. Ltd., of Scotswood, Newcastle-on-Tyne. Of these engines (Nos. 6650-6699) all will no doubt have been delivered by the time that this statement appears in print, seeing that as many as forty-five have already been constructed and sent to Swindon. The first engine to arrive there was No. 6650, on August 23, 1928, eight others followed in the same month, and the rest of the forty-five reached Swindon during September and October. The numbers of these forty-five run from 6650 to 6694. The weight of the Armstrong engines is 69·35 tons.

(*To be continued.*)



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# New Southern Railway Locomotives.

*(See also Frontispiece.)*

BY the courtesy of Mr. R. E. L. Maunsell, C.B.E., Chief Mechanical Engineer, Southern Railway, we are enabled to illustrate and describe two interesting designs which are now being placed in service. The first is a new type of tank locomotive designed by him and built at the company's works, Brighton, for service in the principal goods yards and sorting sidings on the Southern Railway. The new locomotives have been designed to exert sufficient power for working trains over humps, while enough play has been given to the leading and trailing wheels to permit of their traversing curves of 4½ chains radius.

The boiler is the standard used on Central Section goods engines and other classes, and it is well adapted for the purpose of shunting as it has large steam and water capacity, but a very moderate grate area. Thus heat can be stored while standing, and blowing off at the safety valves minimised, whilst the stand-by loss of fuel is lessened by the limited grate. Ross patent "pop" safety valves are fitted. Superheating has not been adopted, as it was considered of little value for intermittent operations.

Three cylinders have been adopted in conjunction with four pairs of coupled wheels, 4 ft. 8 in. diameter, so as to obtain a large tractive effort for a very moderate engine weight and wheelbase. The even turning moment of three cylinders has been found to be of great value in shunting, giving very steady slow movements, while rapid acceleration is possible for fly shunts.

The cylinders, 16 in. diameter by 28 in. stroke, are interchangeable with Mr. Maunsell's 2-6-0 type three-cylinder engines, Nos. A.822 and A.890, but, unlike them, this engine has three independent valve gears instead of conjugated levers at the front end for working the valve of the middle cylinder. Two Walschaerts gears are used for the outside valves, but it has been found more convenient in this case to adopt a modified form of Walschaerts gear for the middle valve. Two eccentrics are provided on the crank axle, one set at about 90 deg. to the inside crank for operating the expansion link, and the other in phase with the main crank, and taking the place of the usual combination lever attached to the crosshead for giving "lap and lead." A steam reversing gear with steam and cataract cylinders is arranged inside the frame, the operating valves being situated in the cab. The drive is divided, the horizontal outside cylinders connecting to the third axle, and the inside to the second pair, the inclination in order to clear the leading axle being 1 in 8.

A commodious and well-lighted cab is provided, having a ventilator in the roof. The engine is fitted with hand and steam brakes, and has a vacuum ejector and piping for working vacuum-braked trains. The steam brake valve is graduable by hand application, or in combination with the vacuum brake. Steam heating pipes are fitted so that the engines can perform pilot duties with passenger trains when required. The tanks have a water capacity of 1,500 gallons, and the bunker holds 3 tons of coal without piling.

Principal dimensions are as follow:—

| | |
|---|---|
| Cylinders (3) .. .. | 16 in. and 28 in. |
| Wheels, diameter .. .. | 4 ft. 8 in. |
| Wheelbase .. .. .. | 17 ft. 6 in. |
| Heating surface— | |
| Tubes .. .. .. | 1,173 sq. ft. |
| Firebox .. .. | 106 sq. ft. |
| Total .. .. | 1,279 sq. ft. |
| Grate area .. .. | 18.4 sq. ft. |
| Boiler working pressure .. | 180 lb. per sq. in. |
| Weight in working order | 71 tons 12 cwt. |
| Adhesive weight .. .. | 71 tons 12 cwt. |
| Water capacity .. .. | 1,500 gallons. |
| Coal capacity .. .. | 3 tons. |

The engines, which are to be known as Class "Z," are numbered A.950 to A.957. They are painted black with fine green lines, and are compact and symmetrical in appearance. A tractive effort of 13.1 tons is obtained on an adhesive weight of 91.6 tons, giving a high factor of adhesion of 5.46.

Other details include hand sanding, standard sight feed lubricators, and steam-operated cylinder cocks. These are the first "A" engines to have the driver's position on the left-hand side of the cab.

The second design constitutes a new



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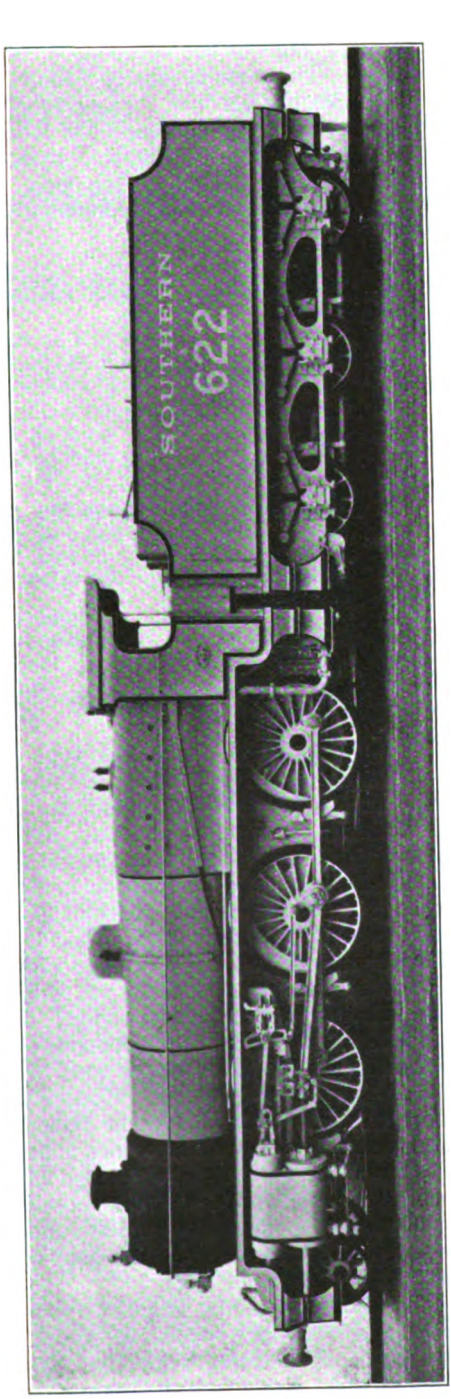


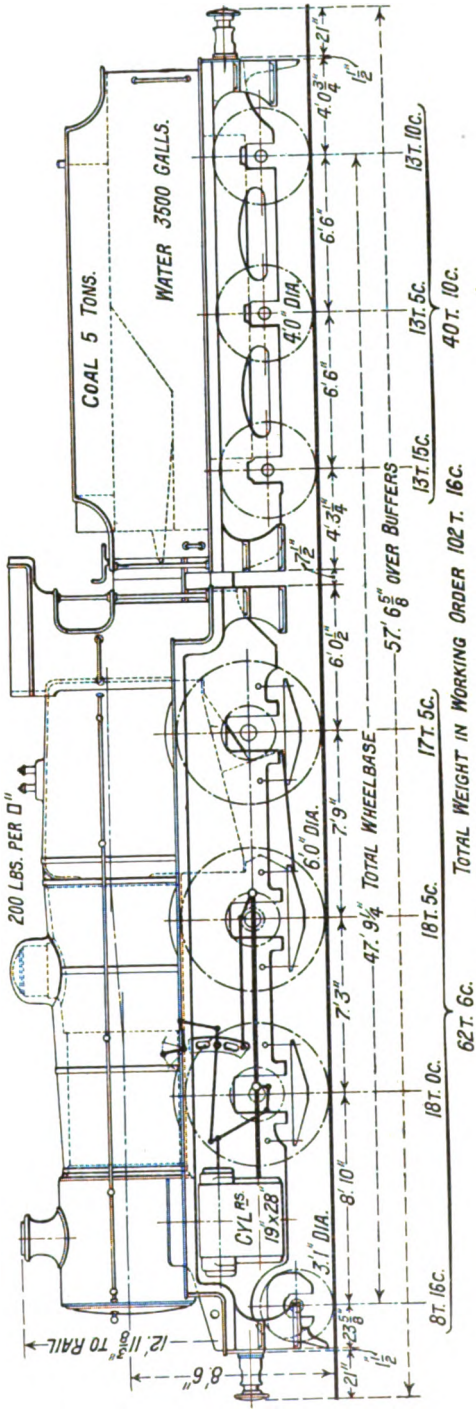


NEW 2-6-0 LOCOMOTIVE, SOUTHERN RAILWAY.

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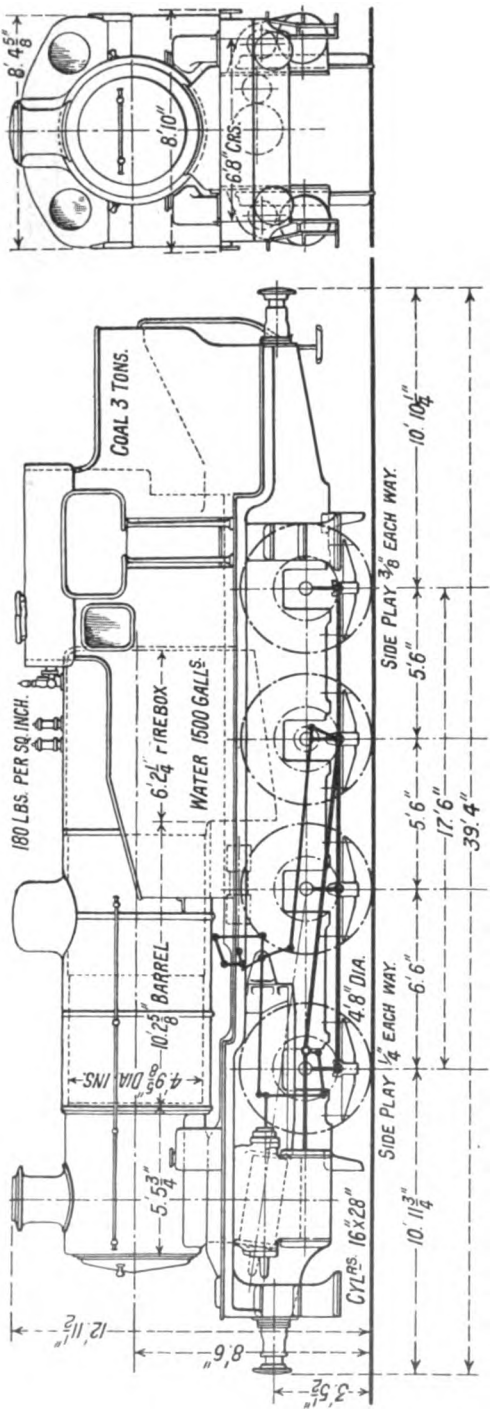
class of passenger locomotive, having the 2-6-0 wheel arrangement and two outside cylinders, recently placed in service. Ten of the new engines have been constructed at the Southern Railway Company's Works at Brighton, whilst another ten are being built at the company's Ashford Works. The design closely follows that of Mr. Maunsell's " N " class 2-6-0 type mixed-traffic engines, nearly the whole of the parts, *i.e.*, the boiler, cylinders, motion, frame details, valve gear, etc., being identical, the only difference being in the wheels and framing.




| | |
|---|---|
| Cylinders, diameter .. | 19 in. and 28 in. |
| Wheels— | |
| Bissel truck .. .. | 3 ft. 1 in. dia. |
| Coupled .. .. | 6 ft. dia. |
| Heating surface— | |
| Small tubes .. .. | 1,034.0 sq. ft. |
| Large tubes .. .. | 356.6 sq. ft. |
| Firebox .. .. .. | 135.0 sq. ft. |
| Total .. .. | 1,525.6 sq. ft. |
| Superheater surface (inside) | 285.0 sq. ft. |
| Grate area .. .. .. | 25.0 sq. ft. |
| Boiler working pressure .. | 200 lb. per sq. in |
| Weight in working order— | |
| Engine .. .. .. | 62 tons 6 cwt. |
| Tender .. .. .. | 40 tons 10 cwt. |
| Total .. .. | 102 tons 16 cwt. |

The adoption of the 2-6-0 type locomotive as a purely passenger type, as distinct from goods or mixed traffic requirements, is a new departure, and has been facilitated by the provision of coupled wheels of 6-ft. diam. as compared with 5 ft. 6 in. of the previous engines of the same general class. This enables the engines to be put to a large range of duties in passenger working, as they are suitable for a maximum speed of 70 m.p.h., while their large adhesive weight enables them to take longer and heavier trains than the 4-4-0 type. Consequently they can deal with all but the fastest and heaviest services, which require a heavier engine of the 4-6-0 type with large wheels.

The tender, which is of the six-wheeled pattern, has a capacity of 3,500 gallons of water and 5 tons of coal. Its total weight loaded is 40 tons 10 cwt.

The boiler is of the Belpaire type, and carries a working pressure of 200 lb. per sq. in. It is fitted with the Maunsell superheater, Ross patent " pop " safety valves, and a top feed arrangement, in conjunction with the steam dome. The pony truck is fitted with Cartazzi slides.

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# British Locomotive Practice and Performance.

By CECIL J. ALLEN, M.Inst.T., A.I.Loco.E.

*Photo.*] [*F. E. Mackay.*

**VICTORIA-SANDWICH TRAIN NEAR BICKLEY.**
L.S.W. 4-4-0 No. 312.

NO small amount of correspondence has reached me during recent weeks on the subject of the South Wales services of the Great Western Railway, which were described in my February article. "I was interested in your statement," writes one clerical friend, "to the effect that the standard of punctuality is higher on fast schedules than on easier bookings. While it is not my good fortune to travel as extensively as you do, I have been moving about a good deal lately, and have, I think, covered every main line of importance. I hesitate to dispute your arguments, but I cannot help thinking that your correspondent of the South Wales runs is right. The authorities of the L.M.S., in inaugurating their long non-stop running without curtailing running times, stated publicly that their aim was 'reliable running and a high standard of punctuality.' There is little doubt that they succeeded; with such very moderate schedules the 'Royal Scot' expresses could hardly help being up to time, and similarly the L.N.E.R. 'Flying Scotsmen.'

"The authorities of the G.W.R., on the other hand, have adopted a policy of cutting down times wherever practicable. The 'Limited' acceleration of 1927 is an example. But even I, with all my admiration for the Great Western, would not claim that Great Western punctuality is as good as that of the two Northern lines. It is possible that there are more delays on the Great Western, and that their operation is capable of improvement, but surely the principal reason is that the Great Western schedules are so tight as to permit of less recovery of lost time after delays than is possible on the other two lines mentioned. Your recent contention as to the L.N.E.R. 'Pacifics' being so completely masters of their work might not have been so easily made had the L.N.E.R. adopted the Great Western policy of cutting times with the advent of more powerful locomotives.

"On the G.W.R., in my experience, the Paddington-Birmingham two-hour trains are less punctual than the Birmingham trains which travel *via* Oxford. Similarly the West of England trains by the Westbury route are less punctual than those to and from South Wales. A comparison between the timekeeping of the 'Cornish Riviera Limited' express and the 'Flying Scotsman' or the 'Royal Scot' would very likely prove unfavourable to the G.W.R. But this is hardly surprising, as your last published run on the former would indicate. Here was



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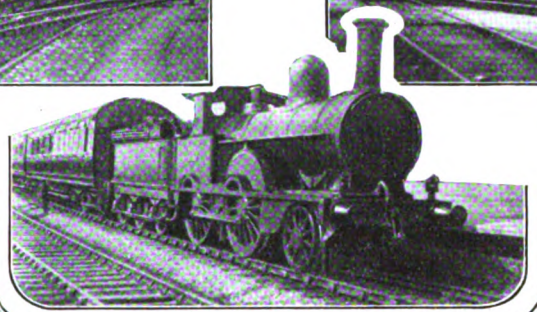
**LIVERPOOL BOAT EXPRESS.**
L.N.W. 4-6-0's Nos. 5804 and 6000.
*Photo. F. R. Hebron.*

**BIRMINGHAM EXPRESS LEAVING DERBY.**
Mid. 2-4-0 No. 1.
*Photo. Henry L. Salmon.*



**L.N.W. 2-4-0 No. 424 "SIRIUS."**
*Photo. P. Ransome Wallis.*

**ST. ALBANS TRAIN NEAR MILL HILL.**
Mid. 0-6-4T No. 2011.
*Photo. G. H. Marillier.*

**UP IRISH MAIL EXPRESS.**
4-4-0 No. 1902 and 4-6-0 No. 2340.
*Photo. F. R. Hebron.*

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the ' Limited ' five minutes late at North Road after a terrible series of checks, whereas under the 25-year-old schedule previously in force it would have been 2 minutes early; and yet that run of yours must have been one of the finest you have ever recorded. I agree most emphatically with the contention of one of your later correspondents that while the Great Western schedules make for magnificent locomotive work, probably superior, day in and day out, to that obtaining on other lines, yet the G.W.R. long-distance standard of punctuality is lower than that of the Northern groups, and for this the high speed of G.W. schedules must be held responsible."

" I think you are rather hard on the engines of the South Wales service," writes another correspondent. " If they get late on the up journey in South Wales —and it is a miracle to me how they so often manage to wriggle through without loss of time—they miss their turn nearer London, and you should put the blame either on the congested traffic at the start, or on the signalmen *en route*."

Now comes the correspondent whose runs, with his own description of them, were retailed in February. " You are a *most unscrupulous* controversialist," he writes (this will not, I may add, lead to blows or even acrimony, as we are in reality the best of friends); " for years we have suffered your plaint as to never having noted a punctual arrival in Newport on the down journey, and now, lo and behold! you attack my position by claiming that your down arrivals at Newport have been uniformly punctual! Even if I permit you to select a limited period of travelling in order to suit your argument, I do draw the line at your attributing to me an experience which has no justification in anything I have either written or said to you, and which, moreover, is diametrically opposed to the facts. You say that in your experience, *as well as mine*, the standard of punctuality is considerably higher on westbound than on eastbound trips. If you will take the trouble to average the lateness of arrival in my tables in the article, you will find the reverse to be very decidedly the case, and the average for all my runs over this route, which total a very considerable number, still more belies your statement. I have often been 5 minutes early at Paddington, but never in the down direction, and extensive experience, of meeting trains at both Paddington and Cardiff leaves me in no doubt as to the facts." I would first interject, by way of parenthesis, that as all down South Wales expresses stop at Newport, and the allowance from there to Cardiff is 17 minutes, an arrival at Cardiff early by 5 minutes would entail the running of the 11¾ miles from Newport to Cardiff in 12 minutes, start-to-stop, given a punctual departure from the former place. I can quite believe, therefore, that my friend has not seen or recorded any South Wales express 5 minutes early into Cardiff! As regards unscrupulous controversy, this is, I think, a fair *tu quoque!*

For claiming my correspondent's experience to be the same as my own I must heartily apologise; this was an unfortunate misstatement of fact. But my own figures also leave no room for misconceptions. It is true that up to comparatively recent times I had recorded no absolutely punctual arrival at Newport that I could remember. But since the reconstruction of that station the position has changed entirely, and with very few exceptions all my arrivals at Newport, on a considerable number of journeys which I have recently made, have been to time or very nearly so. On seven successive runs with the 11.55 a.m. down, we have been 2 min. late, ¼ early, 1¾ late, 2¼ early, ½ late and 1½ late at Newport, and this average of ½ minute late would have been changed to one of ½ min. early but for checks in the very last stage from Severn Tunnel Junction to Newport. On the last run mentioned above, *Tintern Abbey*, with 370 tons, and allowed 145 min. to Newport was *stopped twice*—at Brinkworth and Pilning—but yet reached Newport, only 1½ min. late, and rolled into Cardiff a minute early. On the 3.55 down *Caldicot Castle*, with 275 tons, made the start-to-stop run of 100 miles from Paddington to Badminton in 98 min. 50 sec. (for once unchecked), passed Severn Tunnel Junction in comfortable time to make Newport in the allotted 140 min., but was subsequently delayed by fog. On the 7.55 p.m. down *Rumanian Monarch*, with 345 tons as far as Stoke Gifford, delayed outside Reading and subsequently at Chol-

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sey, made the 97.4-mile run from Reading to Newport in 102½ min., or 100½ min. net, and reached there only 1 min. late. The only poor run was one with the 8.55 a.m. down, when, with one slight delay, we reached Newport 3½ min. late.

Against this my up arrivals, on the trains due in Paddington at 11.20 a.m. (three), 9.15 a.m., 1.5 p.m. and 3.10 p.m., have been 3½, 14, 0, 47 (the up boat train, after a very stormy crossing, which afforded ample excuse), 15 and 35 minutes late, and all runs but the boat train experience were in mid-week. The signal delays were chronic on every run, and more particularly between Didcot and Reading, where they cannot be explained away on the ground that all the traffic has to be conducted over two roads. But the special point to be emphasised is that, with the sole exception of two up journeys on which the running was brilliant, the speeds east of Swindon, with the road in favour of the engine, were almost uniformly inferior to those in the opposite direction, even when the trains concerned were running well behind time. One exception referred to was a morning on the 8.35 a.m. up, when *Queen Charlotte,* with a load made up at Newport to 385 tons by the addition there of no less than three 70-ft. dining cars—whether the authorities thought the passengers looked exceptionally lean and hungry is not related—stopped at Severn Tunnel Junction, despite signals at Magor, in 14 min. 5 sec., ran the 70.5 miles from there through the tunnel to a signal stop at Didcot in 82 min. 5 sec., touching 77½ an hour at Little Somerford and 74 at Wantage Road (the 43.5 miles from Badminton to Steventon took 39¾ min.), continued from Didcot to Reading in 20 min. 50 sec., start-to-stop, and from Reading to Paddington, with a top speed of 75 an hour at Slough, in 37 min., or 36½ min. net. So we came up in 160¼ min. gross time, 154 min. actual running time, and the equivalent of well under 140 min. net non-stop time. But this was, as mentioned, exceptional, so that the easier schedules of the South Wales up journeys in no way appear to me to conduce to better time-keeping. Another much-travelled correspondent has just written to say that his experiences, in regard to the relative merit of up and down South Wales running, coincide with mine.

And what about other lines? What important express trains have, in all probability, the best punctuality record on the London and North Eastern Railway? Without much doubt, the "Queen of Scots" and "West Riding Pullman" expresses, boast the fastest schedules in force between King's Cross and Doncaster. The loads are not enormous, it is true, but in proportion to the size of the engines hauling them they are substantial—the full 8-coach "Queen of Scots" formation scales 316 tons empty—and there are gradients between Doncaster and Leeds not far short of the worst on the South Wales route, while King's Cross—Doncaster is, of course, very considerably harder than Paddington—Stoke Gifford. The Great Central section of the L.N.E.R., again, takes a high place in the London and North Eastern punctuality records (except in the case of trains worked through to or from other sections or systems), despite the fact that nearly all the fastest London and North Eastern point-to-point schedules are in operation over it. Here again loads are light, but the gradient profiles reproduced in last month's issue bear ample testimony to the exceptional obstacles of grading over which these high-speed expresses have to be worked, and, be it said, for the most part by 4-4-0 locomotives. Here smart timings have bred smart working; and the same could undoubtedly be said of the old Midland Railway.

If schedules are made excessively tight, of course, or if the loads of tightly-timed trains increase to the point when the locomotives employed can no longer satisfactorily handle them, consistent punctuality cannot be expected. We have examples of this in the London—Leicester schedule of the 6.20 p.m. out of Marylebone, or the 82-min. allowance (since eased out) of the down "Hook Continental" of the L.N.E.R. This cannot be said, however, of even the most noteworthy Great Western bookings; the most difficult of them still appear to afford ample margins of time, given the right type of locomotive for the train and the right driver, as these columns have unceasingly borne witness; although this would not be the case apart

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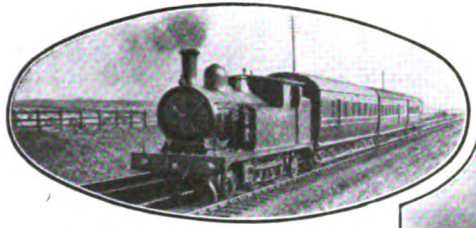

**ALNWICK-BERWICK TRAIN NEAR BELFORD.**
N.E. 2-4-2T No. 21.
*Photo. C. J. L. Romanes.*

**DOWN FLYING SCOTSMAN, NEAR POTTERS BAR.**
*Photo. H. Gordon Tidey.*

**GRANTHAM TRAIN AT OAKLEIGH PARK**
G.N. 4-4-2 No. 4440.
*Photo. the Late H. L. Hopwood.*

**MANCHESTER-LONDON EXPRESS NEAR RUGBY.**
G.C. 4-4-2 No. 5266.
*Photo. W. Leslie Good.*

**GOODS TRAIN NEAR CLACTON-ON-SEA.**
G.E. 0-6-0 No. 7876.
*Photo. H. Gordon Tidey.*

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from the extraordinary capacity of the express locomotive designs produced during the past quarter-of-a-century at Swindon. So I am still totally unrepentant. Let traffic authorities, whatever be the railway, see that the locomotives are given a fair chance; that drivers are not compelled to fight against the frittering away of time by slack working at stations or the unnecessary blocking of the line by signalmen; and it is probably that the standard of punctuality will be at its highest on the "crack" trains, which by their fast schedules are a special inducement to the travelling public and so should be the object of special care on the part of the railway staffs.

To turn to performance, there must first be continued the relation of my experiences with new locomotive types, begun in the last issue. On a recent journey to Suffolk from London, it was interesting to find at the head of the 12.25 p.m. express at Liverpool Street one of the latest 4-6-0 engines of the Great Eastern type—No. 8577—fitted with Lentz valves. This train, only run as a daily service throughout the winter for the first time this year, has already attained a tremendous formation in proportion to the extent of the passenger complement. As it was a Friday, and therefore the day on which a slip coach is carried for Shenfield, we had no less than fifteen bogies behind the tender, weighing in all 425 tons. From the train it did not appear, however, that the engine was being in the least extended, and we made a delightfully energetic run, the time of 29 min. 15 sec. for the undulating 28.8 miles from Shenfield to Stanway, with 395 tons, being specially noteworthy for an engine of such modest dimensions. Although we had taken things fairly easily out to Romford, too, the ascent to Ingrave was excellent, with its minimum rate of 28 m.p.h. notwithstanding a 425-ton trainload at this point. Thus we reached Colchester in 63 min. 40 sec., over 2¼ min. early. The concluding run from Colchester to Ipswich was also smartly made, with a well-sustained maximum of 72 m.p.h. at Manningtree, and the high minimum of 47 an hour at Belstead Box. This run is tabulated in detail, and the intermediate times and speeds may be noted in the table.

L.N.E.R. LIVERPOOL STREET—IPSWICH.
Engine: 4-6-0 (G.E. type), No. 8577.
Load†: 60 axles, 406 tons tare, 425 tons full.

| Distance. | | Schedule. | Actual. | Speed. |
|---|---|---|---|---|
| Miles. | | min. | min.sec. | m.p.h. |
| 0·0 | Liverpool Street | 0 | 0 00 | — |
| 1·1 | Bethnal Green .. | — | 3 30 | 20 |
| 4·0 | Stratford .. | 8 | 8 50 | *40 |
| 7·3 | Ilford .. .. | — | 13 25 | — |
| 10·0 | Chadwell Heath | 16 | 16 40 | 48½ |
| 12·4 | Romford .. | — | 19 40 | — |
| 15·0 | Harold Wood .. | — | 22 55 | 50½ |
| 18·2 | Brentwood .. | — | 27 35 | — |
| 19·3 | Ingrave Box .. | — | 29 50 | 28 |
| 20·2 | Shenfield (slip).. | 30 | 31 15 | — |
| 23·6 | Ingatestone .. | — | 34 45 | 64 |
| 28·9 | Crompton's Box | — | 39 40 | 67 |
| 39·7 | Chelmsford .. | 40 | 40 30 | *60 |
| 32·1 | New Hall Box .. | — | 43 00 | 55½ |
| 35·9 | Hatfield Peverel | — | 46 55 | — |
| 38·6 | Witham .. | 50 | 49 45 | 65 |
| 42·3 | Kelvedon .. | — | 53 25 | — |
| 44·1 | Hill House Box | — | 55 20 | 53½ |
| 46·6 | Mark's Tey .. | — | 58 05 | 61½ |
| 49·0 | Stanway Box .. | — | 60 30 | 66 |
| 51·7 | Colchester .. | 66 | 63 40 | — |
| 2·4 | Parson's Heath Box .. .. | — | 5 10 | 33 |
| 4·3 | Ardleigh .. | — | 7 45 | — |
| 7·8 | Manningtree .. | 11 | 11 15 | 72 |
| 11·5 | Bentley .. | — | 14 50 | — |
| 13·5 | Belstead Box .. | — | 17 15 | 47 |
| 16·3 | Halifax Jc. .. | — | 20 15 | 65 |
| 17·0 | Ipswich .. | 22 | 21 55 | — |

† 56 axles, 378 tons tare, 395 tons full, from Shenfield to Ipswich.
* Service slack.

I have also had with another type which, perhaps, was rather maligned in the last issue, a run more nearly representative of the capacity of the engines concerned. By way of parenthesis, I may state here that the bad run with L.N.E. 3-cylinder 4-4-0 *Lincolnshire* on the 5.30 p.m. out of King's Cross, which was mentioned last month, was due to the development of a mechanical defect, which made it necessary to work the engine in a long cut-off throughout, and this inevitably resulted in shortness of steam. To the correspondent who sends the information I am grateful for the opportunity of putting right any misconceptions as to the ability of either engine or driver, who was none other than the redoubtable Sparshott. To revert to my other "Shire" run, on the 12.56 p.m. L.N.E.R. express from Newcastle to Oxford, No. 256, *Hertfordshire,* had

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L.N.E.R. DARLINGTON—YORK.

Engine : "Super-Pacific" No. 2744, *Grand Parade.*
Load : 44 axles, 393 tons tare, 420 tons full.

| Distance. | | Actual. | Speed. |
|---|---|---|---|
| Miles. | | min. sec. | m.p.h. |
| 0·0 | Darlington .. .. | 0 00 | — |
| 2·6 | Croft Spa .. .. | 4 55 | 51 |
| 5·2 | Eryholme .. .. | 8 10 | 49 |
| 6·9 | Cowton .. .. | 10 05 | — |
| 10·4 | Danby Wiske .. | 13 20 | 64½ |
| 14·1 | Northallerton .. | 16 50 | 64½ |
| 17·5 | Otterington .. .. | 19 50 | 71½ |
| 21·9 | Thirsk .. .. | 23 30 | 72½ |
| 26·1 | Sessay .. .. | 27 00 | 72½ |
| 28·0 | Pilmoor .. .. | 28 35 | 72½ |
| 30·7 | Raskelf .. .. | 30 50 | — |
| 32·9 | Alne .. .. .. | 32 35 | 75 |
| 34·4 | Tollerton .. .. | 33 50 | 72½ |
| 38·1 | Mile-post 6 .. .. | 37 00 | — |
| 38·6 | Beningbrough (sig. stop) .. .. | 38 10 | — |

to haul a 10-coach train weighing 306 tons empty and 320 tons full. We started away from Darlington in good style, passing Croft Spa in exactly 5 min. and Eryholme in 8 min.—speed on the rise between these points was maintained at 53 m.p.h.—Danby Wiske in 13 min. 5 sec., at 67 m.p.h., Northallerton in 16¾ min., at 61 m.p.h., and Otterington in 19 min. 50 sec., at 69 m.p.h. When we had reached 71½ m.p.h., and by the manner of our acceleration seemed likely to approach 75, however, the driver unfortunately eased the engine, as we were getting ahead of time, and the rest of the run is of minor interest. We passed Thirsk in 23 min. 40 sec., at 67 m.p.h., Pilmoor in 29 min. 20 sec., at 61, Alne in 34 min. precisely, at 66, Beningbrough in 39 min. 25 sec., at 61, and Poppleton Junction, 42.5 miles, in 43 min. 15 sec. Signals were against us outside York, but we stopped there in 47 min. 45 sec., 2¼ min. inside time, or 46½ min. net. It is clear from the earlier running that we could have done the 44.1-mile journey without the slightest difficulty in 44 or 45 min., had the occasion demanded.

Another recent journey over the same course is deserving of mention, as it illustrates the capacity of the latest high-pressure "Pacifics" for high sustained speeds over level track. The train in this case was the up "Flying Scotsman," and No. 2744, *Grand Parade,* flew to such good purpose with a 420-ton train that we covered the 20.6 miles from Otterington to mile-post 6 in 17 min. 10 sec., at an average of precisely 72 miles per hour, reaching a top speed of 75 an hour at Alne. Then, unfortunately, we were brought to a dead stand at Beningbrough—presumably while some laggard freight cleared into the reception road at Skelton Bridge—having covered the 38.6 miles from Darlington to this point in 38 min. 10 sec., start-to-stop, which is less than "even time." We were kept standing for 4 minutes (a striking illustration of one of the unnecessary checks to which I have previously referred, seeing that there is continuous reception accommodation over the 5¾ miles from Alne to Beningbrough, in which the defaulting train might surely have been held, instead of being allowed to take the main line for this short stretch of 2½ miles immediately in front of us), so that keeping time to York was, of course, out of the question. We had left Darlington 4 min. late, and there is little doubt that, but for this delay, we should have recouped the arrears by stopping in York

L.N.E.R. HATFIELD—PETERBOROUGH.

Engine : 4-4-2 No. 4459.
Load : 30 axles, 282 tons tare, 295 tons full.

| Distance. | | Schedule. | Actual. | Speed. |
|---|---|---|---|---|
| Miles. | | min. | min. sec. | m.p.h. |
| 0·0 | Hatfield¶ .. | 0 | 0 00 | 69 |
| 2·6 | Welwyn Garden City .. | — | 2 25 | — |
| 5·8 | Woolmer Green | — | 5 45 | 55 |
| 10·9 | Stevenage .. | — | 10 40 | — |
| 14·2 | Hitchin .. | 14 | 13 30 | — |
| 18·0 | Three Counties.. | — | 16 20 | 85 |
| 19·3 | Arlesey .. .. | — | 17 20 | ‡76½ |
| 23·4 | Biggleswade .. | — | 20 30 | 79 |
| 26·4 | Sandy .. .. | — | 22 50 | 80½ |
| 29·8 | Tempsford .. | — | 25 25 | 76½ |
| 34·0 | St. Neots .. | — | 28 55 | 71½ |
| 38·3 | Offord .. .. | — | 32 20 | 76½ |
| 41·2 | Huntingdon .. | 38 | 34 45 | 72½ |
| 44·3 | Leys Box .. | — | 37 50 | 57½ |
| 45·8 | Abbot's Ripton | — | 39 20 | †80½ |
| 51·7 | Holme .. .. | — | 44 05 | 74 |
| 54·9 | Yaxley .. .. | — | 46 55 | 64½ |
| 57·3 | Fletton Jc. .. | — | 49 00 | 64 |
| 58·7 | Peterborough§ .. | 56 | 51 15 | *15 |

¶ Passed at full speed.
§ Passed at reduced speed.
‡ At Langford. * Service slack.
† At Connington.

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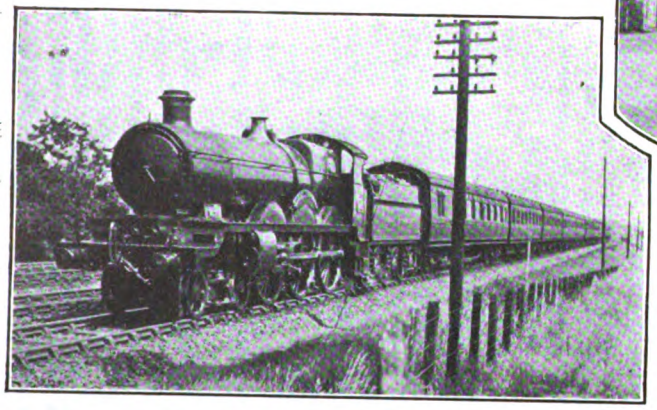
UP "CORNISH RIVIERA" AT ST. ERTH.
2-6-0 No. 5385 and 4-6-0 No. 4019.
*Photo. P. Ransome Wallis.*

**0-6-0T AND WAGONS ON WEYMOUTH QUAY.**

*Photo. G. N. Southerden.*

DOWN READING TRAIN.
4-4-2T No. 2228.
*Photo. M. W. Earley.*



DOWN EXPRESS EXCURSION.
4-6-0 No. 4033 *Queen Victoria.*
*Photo. J. Dearden.*

UP MINERAL TRAIN.
2-8-0 No. 2802.
*Photo. Henry L. Salmon.*

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in 44 minutes—no mean feat with such a load, and in view of the cautious travelling which is necessary over the curves in the final 1½ miles of the run. Times and speeds on this exhilarating trip are also tabulated.

The last-mentioned journey, made on one of the very coldest days in our Arctic February, was one of three made in two consecutive days, each over a different route, and all remarkable by reason of exceptionally high speed. On the previous day I had travelled northward by the " Queen of Scots " Pullman, and had broken every record I have ever made between Hitchin and Huntingdon by covering that stretch of 27 miles in 21 min. 15 sec., at an average rate of 76.2 m.p.h. Over the 46.4 miles from Stevenage to Fletton Junction we took 38 min. 30 sec., and so averaged 72.3 m.p.h. The maximum rate at Three Counties was 85 m.p.h., and after a brief drop to 76½ beyond Arlesey, we just exceeded 80 again after Sandy—a speed I have never previously noted anywhere between Arlesey and Connington (Holme), save once when we reached it momentarily at Huntingdon on the very light 11 a.m. from Nottingham to King's Cross, of days now long gone by. The " eighty " line was crossed for the third time in succession at Connington on this trip, after we had breasted Stukeley bank at a minimum of 57½ m.p.h. No. 4459, Ivatt " Atlantic," was the engine, with a load of six of the all-steel 8-wheeled Pullmans and a 12-wheeler bringing up the rear, a total of 282 tons empty and 295 tons with passengers and luggage. The flying part of the run is tabulated, but not the remainder, as we had been badly delayed by relaying at Potter's Bar, and then, after passing Stoke, something went amiss with the engine, and we reached Leeds 8 min. late. The actual times were 28 min. 55 sec. from King's Cross to Hatfield, 80 min. 10 sec. to Peterborough, 108¼ min. to Stoke, 114½ min. to Grantham (it was on the down grade from Stoke to Grantham that the distressing symptoms, very much resembling those of shortness of steam, first appeared), 128 min. 35 sec. to Newark, 151 min. 5 sec. to Retford, 172 min. 10 sec. to Doncaster, 196 min. 5 sec. to Wakefield, and 213 min. to Leeds. It was a sad anti-

L.M.S. LEEDS—CARLISLE.

Engine : 3-cyl-compound 4-4-0, No. 1072.

Load : 36 axles, 247 tons tare, 260 tons full.

| Distance. | | Schedule. | Actual. | Speed. |
|---|---|---|---|---|
| Miles. | | min. | min.sec. | m.p.h. |
| 0·0 | Leeds .. .. | 0 | 0 00 | — |
| 3·2 | Kirkstall .. | — | 6 10 | — |
| 7·6 | Apperley Bridge | — | 11 00 | 53½ |
| 10·9 | Shipley N. Junc. | 15 | 15 05 | *25 |
| 13·8 | Bingley .. .. | — | 19 05 | 56½ |
| 17·0 | Keighley .. | 22 | 22 40 | 51 |
| 23·1 | Cononley .. | — | 29 25 | 62½ |
| 26·2 | Skipton .. | 33 | 32 10 | *30 |
| 29·9 | Gargrave .. | — | 37 30 | 47½ |
| 32·8 | Bell Busk .. | — | 41 45 | 45 |
| 36·2 | Hellifield .. | 48 | 46 05 | — |
| 3·3 | Settle Junc. .. | 5 | 4 45 | 62½ |
| 5·2 | Settle .. .. | — | 6 50 | 45 |
| 11·2 | Horton .. .. | — | 16 45 | 31½ |
| | | — | — | 37½ |
| 16·0 | Ribblehead .. | — | 25 30 | 33 |
| | | — | — | 37½ |
| 17·3 | Blea Moor Box | 27 | 27 35 | 34½ |
| | | | p.w.s. | 30 |
| 22·1 | Dent .. .. | — | 34 20 | — |
| 25·4 | Hawes Junc. .. | — | 38 10 | 57 |
| 28·4 | Ais Gill Box .. | 40 | 41 50 | 43½ |
| 35·3 | Kirkby Stephen | — | 48 35 | — |
| 38·5 | Crosby Garrett | — | 51 15 | 82 |
| 43·5 | Ormside .. | — | 54 55 | 85 |
| 46·0 | Appleby .. | 57 | 57 00 | 65 |
| 48·9 | Long Marton .. | — | 59 35 | 76½ |
| 52·1 | New Biggin .. | — | 62 15 | 71½ |
| 53·4 | Culgaith .. | — | 63 20 | 74 |
| 57·0 | Langwathby .. | — | 66 25 | 67 |
| 58·4 | Little Salkeld .. | — | 67 40 | 71½ |
| 61·3 | Lazonby .. | — | 70 00 | 75 |
| | | — | — | 56½ |
| 66·8 | Armathwaite .. | — | 75 30 | 67 |
| | | — | — | 55 |
| 70·0 | Cotehill .. | — | 78 35 | 72½ |
| 74·1 | Scotby .. .. | — | 82 10 | 70½ |
| 76·8 | Carlisle .. .. | 89 | 86 00 | — |

* Service slack.

climax to the previous high speed effort, and does not, I fear, add much weight to my previous argument as to the punctuality of the " Pullmans."

The third of the three trips mentioned was made from Leeds to Carlisle by L.M.S., immediately following on the Darlington to York run previously described. I was on the way from Middlesbrough to Barrow-in-Furness, and should have travelled direct from Hellifield to Carnforth, but the sight of Hellifield platform (never exactly a health resort), scourged with driving snow on this icy

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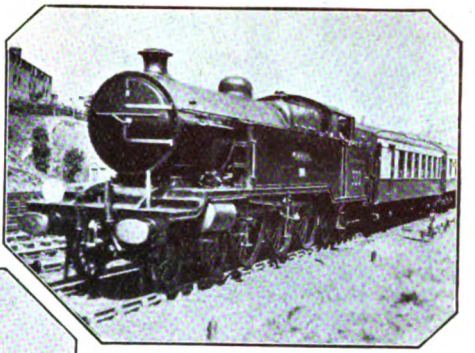
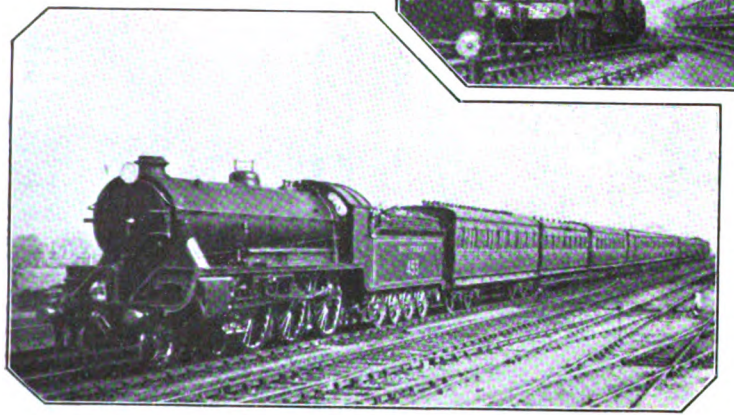
4-4-0 No. A. 228 AT REIGATE.
*Photo. G. G. Hart.*

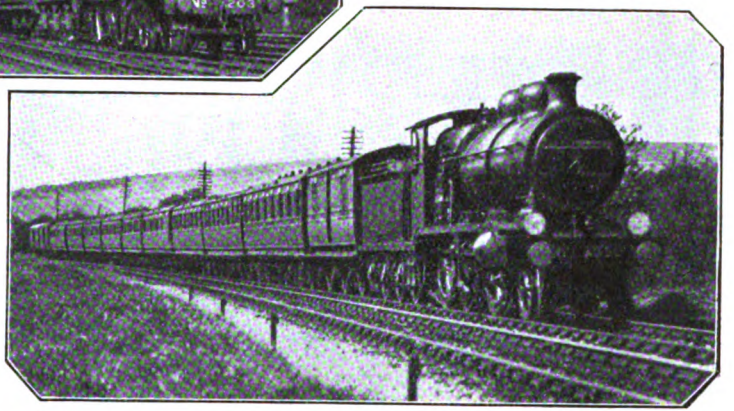
**EXPRESS PASSENGER AND GOODS TRAINS ON PARALLEL LINES.**
*Photo. H. Gordon Tidey.*



**No. B. 333** *Remembrance.*
*Photo. P. Ransome Wallis.*



**MID-DAY WEST OF ENGLAND EXPRESS.**
4-6-0 No. E 453 *King Arthur.*
*Photo. Henry L. Salmon.*



**VICTORIA-BRIGHTON TRAIN.**
2-6-0 No. B 350
*Photo. C. J. Welch.*

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afternoon, from within the congenial warmth of a comfortable *coupé*, decided me to remain where I was until Carlisle, coming south from there to Carnforth by the 7.10 p.m. train. The running from Leeds to Hellifield, after a late start from Leeds, was an additional inducement to observe what the same driver and engine would do over the mountain section, and as it turned out the venture was well rewarded. In this case the run is tabulated through from Leeds to Carlisle, and it will be seen that, despite the very adverse weather conditions, the driver recouped 5 min. of the lost time, 2 min. to Hellifield and 3 min. from there to Carlisle. As, however, we dropped 2 min. from Settle Junction up to Ais Gill, it follows that a clear 5 min. was gained in running down from there to Carlisle.

The snow had now ceased, and in good visibility conditions the descent of the Eden Valley was really thrilling. And let me say, at the same time, that the travelling was the smoothest, even at the highest speed, that I have noted over this route for many years past. As has often been previously explained in these columns, given permanent way and rolling stock in good order, if the track on falling grades is suitably super-elevated for high speeds, it is clear that smoother running is likely at those speeds than at such lower speeds as the caution of the driver may dictate. In this case the speed for miles from below Kirkby Stephen to Ormside was round about the "eighty" level, and we touched 85 m.p.h. just before entering on the rise to Appleby. From Ais Gill down to Kirkby Stephen, strangely enough, the rate was not allowed to exceed 60 m.p.h., but over the 26.0 miles from there to Lazonby we averaged 73.3 m.p.h., and the 45.7 miles from Ais Gill to Scotby, including the sharp up-grades between Lazonby and Cotehill, were completed at an average of exactly 68 an hour. Net time from Hellifield to Carlisle was about 85 min., representing an average start-to-stop speed of 54.2 m.p.h. right over Ais Gill, and with a substantial load for a 4-4-0 locomotive. It is of interest to note that last summer the 46 min. from Leeds to Hellifield and 86 min. thence to Carlisle, achieved on this occasion, were the regular bookings of this train on Saturdays, owing to the necessity of recouping the late start from Leeds occasioned by the Saturday relief express from St. Pancras to Leeds. It would be of interest to know on how many occasions, apart from the provision of piloting assistance, these times were actually observed.

I have had two other runs on this service that are worthy of mention here; the loads were again nine bogies, weighing 260 tons, on each trip. Compound No. 1001 passed Settle Junction in 4 min. 50 sec., Settle in 7 min. 5 sec., Horton in 17 min. 5 sec., Ribblehead in 25¾ min., Blea Moor in 28 min. 10 sec., Dent in 35 min. 35 sec., Hawes Junction in 39 min. 35 sec., and Ais Gill in 43 min. 5 sec.—an inferior climb to that of No. 1072, except in its very last stage, as we passed Ais Gill at 50 m.p.h. But we beat the latter engine by 70 sec. from Ais Gill to Kirkby Stephen, passing that station at 77½ m.p.h., and touching 80½ at both Crosby Garrett and Ormside, with an intervening "minimum" of 72½ m.p.h. This carried us through Appleby in 57 min. 50 sec. Subsequent speeds were much lower; so we took 67 min. 55 sec. to Langwathby, 77½ min. to Armathwaite, 84½ min. to Scotby, and 88 min. 35 sec. to Carlisle.

On the third run we were horsed by one of the remaining "990's," ably driven by Davenport. We got through Settle Junction in 4¾ min., at 65 m.p.h., and then passed Settle in 6 min. 55 sec., Horton in 17¼ min., Ribblehead in 25 min. 35 sec., Blea Moor in 27 min. 55 sec., Dent in 35 min., Hawes Junction in 38¾ min., and Ais Gill in 42 min. 25 sec. Once again we descended smartly, touching 79 an hour before Kirkby Stephen and 80½ after, with a second 79 after slowing to 67 through Crosby Garrett, which we passed in 51 min. 5 sec—10 sec. better than the time from Hellifield of No. 1072—but only to be stopped by adverse signals at Ormside. The stop was merely momentary, but it cost us quite 4 min. There was some further fine running below Appleby, with speeds of 77½ at Culgaith, 70½ at Langwathby, 52 minimum after Lazonby and 72½ at Cumwhinton; passing times were 60¾ min. to Appleby, 63¾ min. to Long Marton, 67½ min. to Cul-

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G.W.R. LEAMINGTON–PADDINGTON.
Engine: 4-cyl 4-6-0 No. 5002, *Ludlow Castle*.
Load: 32 axles, 246 tons tare, 260 tons full.

| Distance. | | Schedule. | Actual. | Speed. |
|---|---|---|---|---|
| Miles. | | min. | min.sec. | m.p.h. |
| 0·0 | Birmingham .. | 0 | 0 00 | — |
| 3·3 | Tyseley .. | — | 5 15 | — |
| 7·0 | Solihull .. | — | 9 15 | 60 |
| 10·4 | Knowle .. | — | 12 35 | 70½ |
| 13·0 | Lapworth .. | — | 14 45 | 74 |
| 17·2 | Hatton .. .. | — | 18 20 | — |
| 21·3 | Warwick .. | — | 21·45 | †80½ |
| 23·3 | Leamington .. | 25 | 24 30 | — |
| 3·8 | Fosse Road .. | — | 5 55 | 55½ |
| 6·1 | Southam Road | — | 8 30 | 55½ |
| | | | — | 70½ |
| 11·1 | Ferry Compton | — | 13 00 | 64½ |
| 16·2 | Cropredy .. | — | 17 45 | — |
| 19·9 | Banbury .. | 22 | 20 45 | 70½ |
| 24·9 | Aynho Jc. .. | 27 | 25 45 | *60 |
| 30·1 | Ardley .. .. | — | 31 00 | 58½ |
| 33·9 | Bicester.. .. | — | 34 05 | 75 |
| 39·9 | Brill .. .. | — | 39 05 | 64½ |
| 43·3 | Ashendon Jc. .. | 44 | 42 10 | *60 |
| 47·3 | Haddenham .. | — | 46 00 | 66 |
| 52·7 | Pr. Risborough | 54 | 51 10 | — |
| 55·8 | Saunderton .. | — | 54 20 | 57 |
| 60·8 | High Wycombe | 63 | 59 15 | *45 |
| 65·7 | Beaconsfield .. | — | 64 20 | 61½ |
| 69·9 | Gerrard's Cross | — | 67 50 | 74 |
| 72·5 | Denham .. | — | 69 55 | 79 |
| 77·1 | Northolt Jc. .. | 79 | 73 30 | — |
| 79·6 | Greenford .. | 81 | 75 30 | — |
| 82·8 | Park Royal .. | — | 78 05 | — |
| 84·1 | Old Oak W. Jc. | 86 | 79 25 | *30 |
| 86·1 | Westbourne Pk. | — | 82 05 | — |
| 87·4 | Paddington .. | 92 | 84 30 | — |

† Reduced to 60 m.p.h. before station.
*Service slack.

gaith, 70 min. 25 sec. to Langwathby, 74 min. 5 sec. to Lazonby, 79¾ min. to Armathwaite, and 86 min. 40 sec. to Scotby, Carlisle being reached in 90 min. 55 sec., or 87 min. net.

During last summer the Great Western provided me with a striking instance of a driver recouping the whole of a serious loss of time occasioned by station working at an intermediate stop, and this on one of the fastest services on the line. The train was the up Aberystwyth express leaving Birmingham at 2 p.m., and we left on time, No. 5002, *Ludlow Castle*, having a modest load of 260 tons all told. The 25-minute booking to Leamington was slightly improved on, as the tabulated particulars show. This particular train is "collected" at Leamington, instead of *en route*, and owing to one recalcitrant passenger without a ticket, the 3 minutes allowed for the stop were expanded to no less than 10! One cannot help thinking that, in the circumstances, it might have been possible to wire Paddington to collect the excess fare on arrival, rather than delay a trainful of passengers for 7 minutes to do so at Leamington. Fortunately, however, we had a sportsman on the footplate, as the subsequent times show; I wish I had thought to obtain his name. And the remarkable feature of the time of 84½ minutes over the 87.4 miles to Paddington was that it was not achieved by means of excessively high downhill speeds, or by scamping service slacks, but by the brilliance of the uphill running. Note the sustained 55½ m.p.h. up the 1 in 187 to Southam Road, the 64½ up the 1 in 236 past Fenny Compton, the drop merely from 60 to 58½ up the 1 in 200 from Aynho Junction to Ardley, and the 57 up the 1 in 167 past Princes Risborough, and, lastly, the acceleration from High Wycombe slack sufficient to produce a speed of 61½ an hour up the adverse length to Beaconsfield—an astonishing sequence! An entire absence of checks, again, enabled us to make a very fast run in from Old Oak to Paddington, with the result that no less than 7½ min. were gained from Leamington to Paddington. We had actually run from Birmingham to Paddington in one minute under two hours, despite standing for precisely 10 minutes at Leamington! The time of 69 min. 35 sec. over the 76.7 miles from Southam Road to Park Royal —average 66.1 m.p.h. over this heavily undulating stretch, slacks included—would, one imagines, want some beating.

In conclusion I mention one further Great Western run which intrigued me a good deal at the time, because of the high speed developed by an unusual type of locomotive. It was my good—or bad —fortune to be travelling from Chippenham to Nottingham in the late afternoon and evening. The alternative epithet is used, seeing that by no possible stretch of the imagination could the service itself be described as good. The Aberdeen—Penzance express, which is the only evening direct service to the North from this part of the country, passes through Chippenham without stopping at about 5.49

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*Photo.*] [*F. R. Hebron.*

**L.N.E.R. "FLYING SCOTSMAN" EXPRESS PASSING PALMERS GREEN ON ITS WAY TO HERTFORD FOR FILM PURPOSES, AS ARRANGED BY BRITISH INTERNATIONAL FILMS LIMITED, ELSTREE.**

p.m. The "connection" from Chippenham modestly gets away from there at 3.13 p.m. in the afternoon, to catch an express leaving Swindon, 16¾ miles away, at 6.20 p.m. Actually I left by the 3.36 p.m. down, reached Bristol at 4.13 p.m., entrained in the last coach of the 5.15 p.m. two-hour express to London, was slipped at Swindon at 6.5 p.m., and made the connection in that way. It would, however, have been possible to leave by rail-motor at 4.25 p.m. for Trowbridge, in the down direction, and to have intercepted the North express there. But surely it might be possible to arrange at least a *conditional* stop of the "Aberdeen" at Chippenham, to pick up for Leicester or beyond, in the not desperately difficult schedule of this express between Westbury and Swindon?

This has been a lengthy introduction to the run itself. A 4-4-0 locomotive, No. 3451, *Pelican*, was provided to work the Aberdeen train forward from Swindon, with a moderate load of 210 tons. We got away in tremendous style, passing Shrivenham at 64½ m.p.h., Uffington at 68, Challow at 70½, Wantage Road at 71½ and Steventon at a sustained 72½ m.p.h.! Times to these stations were respectively 8 min. 10 sec., 12¾ min., 15 min. exactly, 17 min. 55 sec., and 21 min. 10 sec., in the last case for 20.8 miles from the dead start. Signal and permanent way checks befell us between Foxhall Junction and Oxford, so that our time of 38 min. 55 sec. to Oxford was but little more than a minute under that scheduled, and there was little in the subsequent running to merit attention. But this was an excellent effort in its early stages.

Acknowledgment is due, finally, to H. J. J. Griffith, R. J. Dallas, A. W. Smith, R. Dyson, L. A. Cornwell, R. A. H. Weight, G. W. Debenham, C. E. W. Neat, A. C. Hawkins, D. S. Foulkes-Roberts, W. A. Tuplin, A. G. W. Reed, E. T. C. Bagshawe, G. J. Aston, A. S. Hinks, A. H. Holden, and "Stirling 4-4-0" for interesting letters received during the past month.

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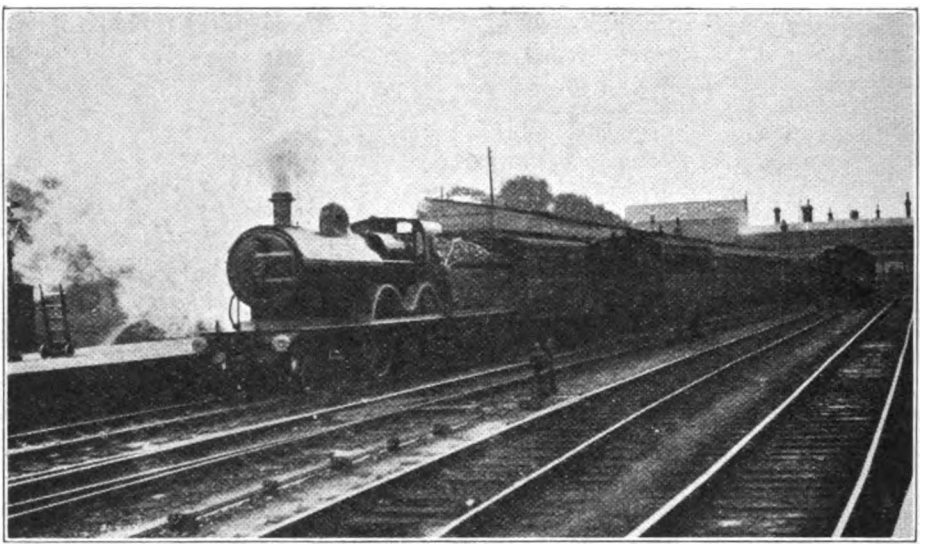

M. & G.N. JOINT RAILWAY TRAIN AT KING'S LYNN.

# The Norfolk Lines of the London and North Eastern Railway. [No. III.]

(*Photographs by the Author.*)

By J. F. GAIRNS, M.Inst.T., M.I.Loco.E.

IN the two previous sections historical aspects have been covered, with general remarks, and in Part II lines in the vicinity of and centring upon Norwich received attention. Notes were also given as to the Norwich–Yarmouth and Lowestoft routes and their train services, the Norwich-Cromer line, &c., and reference made to the associations with the Midland and Great Northern Joint Railway lines. The study is now continued and completed.

Returning now to the Wymondham-Dereham line, this is an important section, there being considerable traffic between these two stations, Dereham being, in fact, a busy country town and, to some extent, a manufacturing centre, while the route from Norwich to King's Lynn, *via* Wymondham, Dereham and Swaffham, conveys a fair amount of through traffic as an alternative to the route *via* Ely. Double-track is available between Wymondham and Dereham, and certain trains are semi-express. At Dereham many trains are divided, the train engine from Norwich continuing on with the front portion to Wells, while another engine is attached to the rear of the train to take the remainder to King's Lynn. Trains in the opposite direction are correspondingly operated. A bay line is provided on the down side at Dereham, and the station has refreshment room and other accommodation. South of Dereham a connecting loop is provided, joining up the Lynn and Wymondham branches, thus completing a triangle, and goods and other trains can, if need be, work through from Norwich to King's Lynn, avoiding Dereham station. North of Dereham the route to Wells is single-track, with intermediate stations at North Elmham, County School, Ryburgh, Fakenham, and Walsingham. In places it is severely graded, the country traversed being of an undulating



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though pastoral character, but the trains are not, as a rule, particularly heavy and all stations are usually served. County School owes its name to the school erected there many years ago and now used for the Watts Naval Training School, a branch of Dr. Barnado's Homes. The connecting line through Foulsham, Reepham and Aylsham makes connection by a sharp curve a short distance from County School station, the two single lines running alongside one another to make connection at the station. South of Fakenham station the Midland and Great Northern Joint line from Melton Constable to King's Lynn is crossed, but no connection is made therewith. Walsingham is interesting as the site of a former abbey. Wells was at one time a port of some importance, but counts for little now.

Approaching Wells terminus the line from Heacham comes in on the down side by a sharp curve, and on the up side, adjacent to the goods depot, there is a branch which runs round to the quay, Wells being a small trading port, at one time of considerable importance, though its trade is by no means insignificant even now. The County School and Wroxham line (single-track throughout) provides a useful connecting link between the Dereham and Wells and Wroxham and Cromer lines, but, except that the country traversed is in many places very pretty, includes no special characteristics, while a service of four or five passenger trains usually suffices. These, as a rule, run between Norwich and Dereham, thus amplifying the facilities of the Cromer branch between Norwich and Wroxham and providing trains, in addition to those to and from Wells, between County School and Dereham. The Heacham and Wells line is also single-track throughout, serving a number of places of local importance, notably Docking, Burnham and Holkham, but is otherwise not specially distinctive. Holkham station serves Holkham Hall —the estate of Lord Leicester—whose predecessors reclaimed a considerable area from the sea by the construction of sand banks some miles in extent, covered with marron and with belts of pine trees alongside to hold the sand and break the force of the winds.

Dealing now with the Swaffham and King's Lynn branch, on leaving Dereham this becomes single-line from Dereham (West) Junction, traversing typical Norfolk country on a 12-mile section to Swaffham. East of that station connection is made with the single line from Thetford, or, rather, from Roudham Junction, where connection is made with the Ely–Norwich main line. This latter branch, as a whole, calls for no special comment.

Roudham Junction is one of the few stations which are announced as only for interchange purposes, tickets not being issued to or from it. At present there are, in fact, no regular main line trains booked to call there, while only one of the Swaffham trains in each direction—8.11 a.m. up and 5.42 p.m. down—calls there, these being for staff purposes. The station was provided in order to enable connections between main line and branch trains, which would be too close at Thetford, to be made at Roudham Junction instead, and such connections are still occasionally made on instructions in the event of trains running late or out of order. The line from Swaffham to King's Lynn, like most of these Norfolk branch and cross lines, is also single-track, controlled by electric train tablet. It passes through exceptionally pretty country, while Narborough station, of which a view was reproduced, is distinguished by the background of poplar trees on the down side. Approaching King's Lynn, the line passes under the Midland and Great Northern Joint line, and soon after reaches the somewhat complicated approaches to the Great Eastern station at King's Lynn. Middleton station has special importance, in that there is adjacent a large deposit of fine sand suitable for glass making, for which reason thousands of tons are annually conveyed to the North and Midlands and at times exported to the Continent.

Three L.N.E.R. routes centre upon King's Lynn : the line from Ely, approaching from the south and curving westward to enter the passenger station, which is terminal ; the Swaffham line, approaching virtually " on the straight " ; and the Hunstanton line, curving in sharply from the north. A short distance south, close to the point where the Midland and Great Northern Joint line crosses the Ely–King's Lynn route, the curve from South Lynn station enables Midland and Great Northern Joint trains to reach the Great

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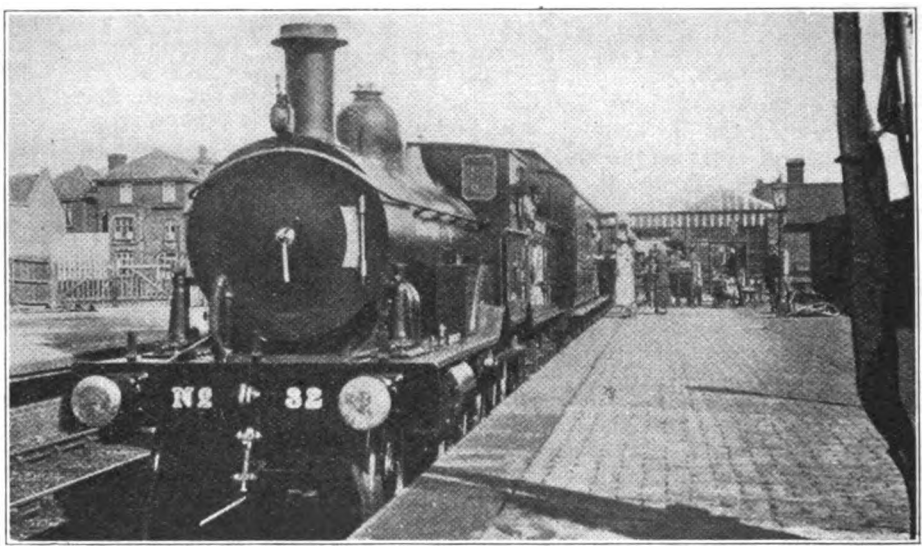
Eastern station. Midland and Great Northern Joint services are, however, more in the nature of local connections to and from South Lynn, the through trains not connecting nearer than South Lynn station. Adjacent to the curve from South Lynn there is a L.N.E.R. branch line to the harbour. From the junction outside King's Lynn station connections are given not only to the goods depot but also, by a branch line, to the King's Lynn docks. The lines of the King's Lynn Dock and Railway Company are worked by the L.N.E.R. The harbour and docks together deal with a considerable shipping trade conducted by smaller vessels, while

must be reversed. In the case of some of the through trains portions terminate or start from King's Lynn, as occurs with some of the through Hunstanton restaurant car expresses. In any case, there is a considerable amount of shunting and other work, so that the station is quite a busy place. In addition to London and North Eastern trains and locomotives' vehicles and engines belonging to the Midland and Great Northern Joint Railway are also concerned, chiefly as connections from South Lynn or as trains from the Spalding direction, continuing from South Lynn to King's Lynn for terminal purposes.

North of King's Lynn the Hunstanton




M. & G.N. JOINT RAILWAY TRAIN AT SHERINGHAM.

connection is thus provided with many of the waterways of this part of the fen country. King's Lynn is, in fact, an important shipping centre on a medium scale, while there are many industrial and other establishments in and about the town, rendering it a busy place not only on the goods side but also in respect of passenger traffic.

King's Lynn station is of considerable size, having two main platforms, each with a bay outside and with two centre roads. It is necessarily terminal for all trains, so that through trains between London and Hunstanton, or, in fact, between any two routes which centre upon King's Lynn,

line is double-track as far as Wolferton station, probably one of the prettiest in the kingdom. Here the buildings are always kept in the best of condition, and there are, in addition to the usual equipment of a country station, Royal waiting rooms, in view of the fact that this is the station for Sandringham. On the up side the platform is open to the roadway, which practically merges into it, so that carriages and motor-cars can be brought close alongside the trains. Onwards to Heacham is single-track, controlled by electric train tablet, the two intermediate stations, Dersingham and Snettisham, being crossing places. At Heacham connection is made

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with the line from Wells already referred to. Branch trains run between Hunstanton and Wells, but frequently make connections with Lynn trains at Heacham Junction. At Heacham signs of the nearness of the beach are in evidence, and a feature of the journey thence to Hunstanton is the long row of beach bungalows, largely consisting of old railway-carriage bodies, which stretch within sight of the line for nearly the whole of this distance. At Hunstanton the terminus is well equipped, there being two double-sided platforms, siding roads, &c., while adjoining the station is the Sandringham Hotel, owned by the London and North Eastern Railway Company, and by no means the least important attraction of this favourite holiday resort.

A few remarks only are necessary as to other sections coming within our subject. The main line between Ely and Wymondham serves a number of important places, mainly Brandon and Thetford, if not specially distinctive. At Thetford the branch line south to Bury St. Edmunds (single-track) is in Norfolk for some distance, Thetford Bridge station, only a short distance from the junction, being of considerable value for that district. Thetford itself, although it is thus a centre for two branch services, northwards to Swaffham and southwards to Bury St. Edmunds, has only the usual two platforms, the local branch trains being placed in sidings for terminal purposes. The Thetford–Bury and Thetford–Swaffham branches are now operated on the conductor-guard principle.

The Stoke Ferry branch leaves the Ely–King's Lynn line at Denver Junction, where short platforms are provided on the main line, though none but branch trains call there. For traffic purposes, Downham, 1 mile 46 chains north of Denver, is regarded as the junction station. The branch is single-line, with two intermediate stations in addition to Denver, served by the branch trains. At Magdalen Road Junction the branch from Wisbech (single-line) joins the direct line from Ely. Trains, however, usually work through to King's Lynn, though connections from or to south of Magdalen Road are sometimes made there.

Finally, a few remarks in regard to the Wisbech and Upwell Tramway, which, as pointed out in introduction, is practically on the border line between Norfolk and the Isle of Ely. This tramway, which runs southwardly from Wisbech station *via* Elm Bridge, Boyce's Depot, Outwell Basin and Outwell Village to Upwell, a distance of 5 miles 72 chains, was first projected in 1873, but it was not until 1881 that the necessary funds could be raised. In that year an Act was obtained, and the line was opened on August 20, 1883, from Wisbech station to Outwell station, and to Upwell on September 8, 1884. Although the line was constructed before the Light Railways Act of 1896 was passed, it is of light railway character, partly running alongside the public road. Passenger trains (now discontinued) called at several intermediate stopping places. The locomotives are entirely covered in and restricted to a maximum speed of eight miles an hour. At the depots or stations there is accommodation for the man in charge, goods office, and several goods sidings, with space to permit of road vehicles being placed alongside the wagons for loading or unloading. At the Upwell terminus the accommodation is as extensive as at many fairly busy main line stations, with warehouse and store, and six siding roads in the goods yard. Where running on the public roads, the rails are fitted with guard rails and embedded in the ballast, so as to offer no obstruction to road vehicles crossing. At the Wisbech station a side platform, of a height suitable for the tramcar type vehicles used on the tramway, is provided.

The normal train service consisted of seven or eight passenger trains each way, and these were permitted to convey not more than two through trucks between Wisbech and Upwell, but not intermediately. There are several regular goods trains scheduled each way daily, and during the fruit seasons these have to be considerably increased. Passenger trains were not permitted to exceed the equivalent of nine vehicles, but ten or even more four-wheeled vehicles are taken on the goods trains. Coal traffic is usually worked separately, the standard load being four fully loaded wagons in winter and five in summer. The maximum grade is 1 in 32. Two or three locomotives are usually in steam daily.



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Apart from the main line routes, traffic on the lines described is usually worked by trains consisting of bogie or six-wheeled main line coaches, the sets in a number of instances making composite journeys, as from Yarmouth to Peterborough, *via* Norwich, Wymondham, Dereham, Swaffham, King's Lynn, Wisbech and March. The locomotives generally employed, except where main line engines are concerned or continued on to one of the branches for traffic convenience, are the well-known "420" class of 2-4-0 mixed-traffic locomotives, and the "1090" class of 2-4-2 tank engines with 5 ft. 8 in. coupled wheels. The rebuilt 4-4-0 locomotives of the "700" class are also to be met with, while 4-4-0's of the "Claud Hamilton" class are gradually finding their way, usually on composite duties, to these lines. On the whole, train services are good and, in many cases, quite liberal for the districts traversed. Activities are mainly agricultural, but many places are centres of manufacturing industry, though usually to meet the needs of agriculture. Fish and other traffic is, of course, strongly in evidence in the Yarmouth and Lowestoft districts. Market traffic is an important factor on most of the lines concerned, while in some parts fruit-growing has become a staple industry. For goods traffic the ordinary 0-6-0 classes or the mixed-traffic 2-4-0's are chiefly used.

In conclusion, the author may express his indebtedness to Col. H. H. Mauldin, Superintendent, Eastern Section; Mr. H. W. C. Drury, Divisional Superintendent, Norwich; Mr. John Miller, now Engineer, North Eastern Company, but formerly in charge of the Engineering Department of the Great Eastern section; Mr. J. B. Willis, Divisional Civil Engineer, Norwich; and Mr. W. H. Hall, of the Operating Department, Norwich, who have, collectively and individually, enabled many interesting points to be brought out and additional information incorporated.

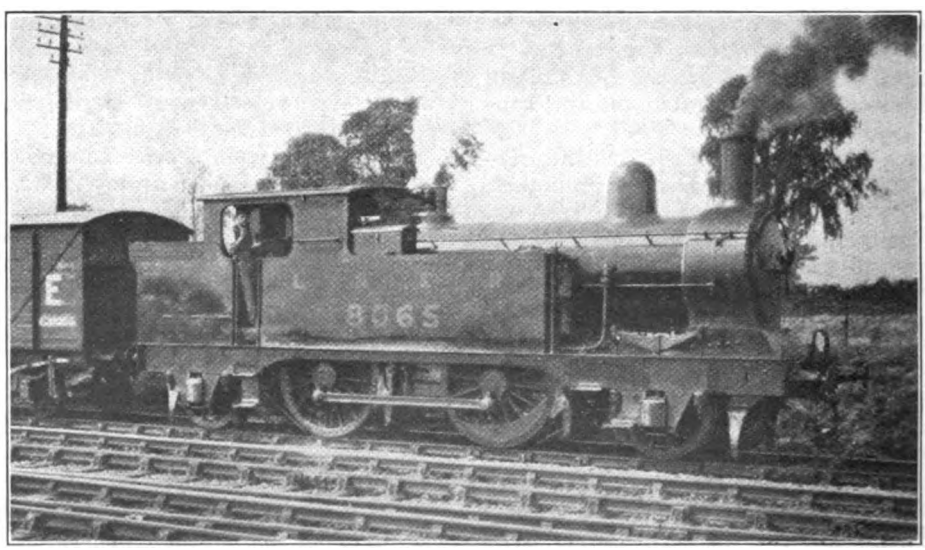


*Photo.*] [*G. H. Young.*

G.E. SECTION 2-4-2 TANK ENGINE No. 8065 AT WITHAM, L.N.E.R.

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# The Main Line Gradients of British Railways.

By "VOYAGEUR."

## V.—LONDON & NORTH EASTERN RAILWAY: SUBSIDIARY MAIN LINES AND BRANCHES, SOUTHERN AND NORTH-EASTERN AREAS.

CONSIDERATION of the various sections of the London and North Eastern system in England which have been covered, up till now, in this series, suggests that the present instalment may be devoted profitably to filling in certain gaps before we repair to Scotland next month. The most notable omission, probably, has been that of the late Great Northern and Great Eastern Joint main line, from March to Lincoln and Doncaster, over which important express train services are worked daily. In order to complete the route followed by the best-known of these trains—the "North Country Continental" from Harwich to Liverpool—there are included with this main route the section from Haughley through Bury St. Edmunds to Ely and March, and the short spur from Sykes Junction, north of Lincoln, to Retford; the gradients and distances between Harwich and Haughley figured in the March article (instalment III) and those from Retford on to Sheffield, Manchester and Liverpool last month. In addition, the Lincolnshire main line of the late Great Northern Railway, from Peterborough to Grimsby, is profiled, with the branch from Firsby to Skegness, which will afford to timers the opportunity of recording the locomotive work on the popular half-day excursion trips from King's Cross to this East Coast resort. Cambridge to Newmarket forms part of the Cambridge and Haughley profile, and by special request there is also shown the old Great Northern main line from Hitchin to Cambridge; the principal express use now made of these two sections is by the special race trains from London in the Newmarket race weeks. Further north, there are added to the North Eastern area profiles the route from Doncaster to Hull, York to Hull and Hull to Scarborough, each of which is followed by various express services daily.

### (1) *PETERBOROUGH TO BOSTON, SKEGNESS AND GRIMSBY* (Sheet 17).

It is almost a waste of paper to reproduce such a profile as this! For 42 miles from Werrington Junction, as will be seen, the line is practically dead level, apart from the awkward but short 1 in 100 start northwards out of Boston Station. From Firsby on to Grimsby no steeper gradient than 1 in 313 is to be found anywhere. Direct trains for Skegness avoid Firsby Station by diverging to the east at Firsby South Junction, round a short and sharply-curved spur to Firsby East Junction. Severe service slacks operate at Peterborough, Werrington Junction, Spalding, Boston, Firsby South Junction and Wainfleet, so that little speed is possible at this end of the London-Skegness run, despite its perfectly level character.

### (2) *HITCHIN TO CAMBRIDGE* (Sheet 17).

This short route is none too easy in character, especially for south-bound trains, which have to face the steep rise from Meldreth past Royston to the high ground at Ashwell, for 4 miles at between 1 in 100 and 1 in 175. There is an interesting past history associated with this line, which before the grouping was Great Northern property from Hitchin to Shepreth, where an end-on junction was made with the Great Eastern system. The two purely Great Eastern stations at Foxton and Harston saw no regular Great Eastern trains whatever, as the Great Northern was responsible for providing the train service throughout the branch. To-day it boasts four semi-fast trains both



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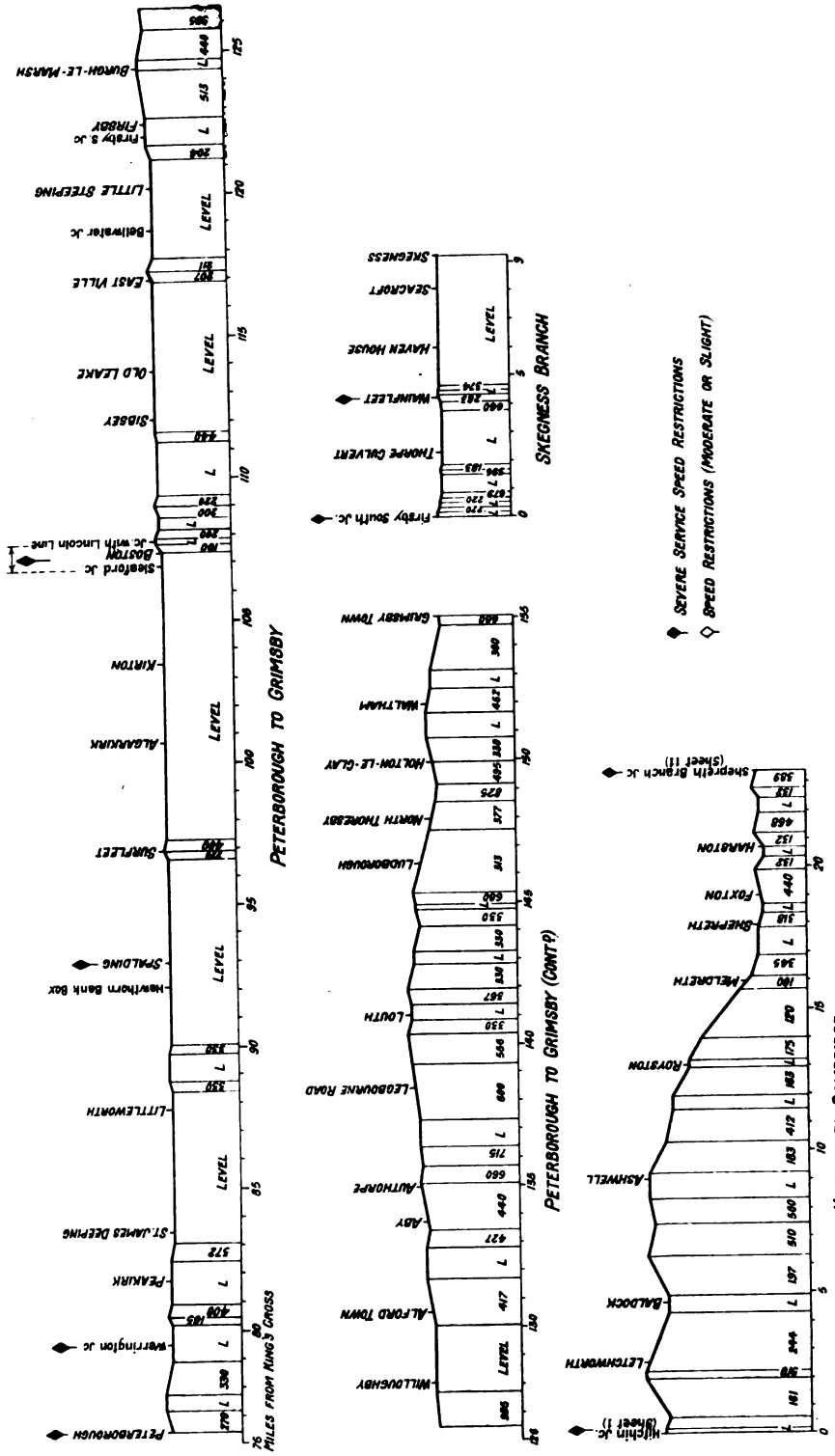


SHEET 17.—GRADIENT PROFILES, LONDON & NORTH EASTERN RAILWAY.

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ways, except on Newmarket race-days, when Pullman and restaurant car services are run through by this route; it is also used by the Royal train *en route* from King's Cross to Sandringham.

(3) *HAUGHLEY TO BURY, NEWMARKET, CAMBRIDGE AND ELY* (Sheet 18).

The locomotives of the L.N.E.R. "North Country Continental" have some of their hardest work to perform through the counties of Essex and Suffolk, where the complete train—in the height of the summer season at times exceeding 450 tons in gross weight—has to be handled over severe gradients, not to mention single-line sections with many service slacks. In the circumstances, the booked speeds through this part of the Eastern Counties are low. From Haughley Junction to Kennett is a succession of four "peaks," approached from either side by inclines from 2 to 4 miles long, and with gradients varying between 1 in 125 and 160 or 170. Continuing with the direct line to Cambridge, the "cut-and-cover" tunnel under the famous Newmarket Heath—the longest on the old Great Eastern system—is still for a single track only, so that single-line working is compulsory between Warren Hill and Newmarket Yard Junctions. Then, after Newmarket, there is the formidable 3-mile climb to Dullingham, as steep at one point as 1 in 88, with the even worse descent, 5¾ miles long, to Fulbourne, for 2½ miles continuously at an average of 1 in 100—a serious obstacle for the heavy race trains.

Direct trains from Ipswich to Ely leave this route at Chippenham Junction, and at Snailwell Junction pass also on to single track, extending in this case for just over 11 miles. Severe slacks for tablet-changing are necessary at the two ends of the single section, as well as at the intermediate crossing stations of Fordham and Soham, but the line has the advantage of being for the most part level.

(4) *ELY TO MARCH, LINCOLN, RETFORD AND DONCASTER* (Sheets 18 and 19).

This is, from the grading point of view, a very easy route. It was to the "Joint Line" that, in the old days, the Great Eastern single-driver locomotives, which had become over-weighted by the heavy loads over the Great Eastern main lines, with their steep gradients, were dispatched to spend their last declining years in the pursuit of speed with the light expresses which were run over the level marches of Lincolnshire. Although the one-time through service between Liverpool Street and York has vanished since the war, fairly tightly-timed trains are still run between March and Lincoln at much the same times as previously, in addition to the boat express, the main section of which now runs to and from Liverpool instead of York; York is, however, served by a four-coach corridor "set" detached at Lincoln. This route is also of considerable importance from the freight point of view, especially since the development of the new and extensive marshalling yard at Whitemoor, just north of March, which acts as a freight distribution centre for the whole of the Eastern Counties. The mile-long Ely South curve is singular, as enabling trains from the North completely to reverse their direction of running without stopping; it is not, of course, used for any such purpose, but is followed by both passenger and freight trains from the Norwich direction proceeding through to March, or *vice versa*, without calling at Ely.

For the 64 miles from Ely to Blankney there is not a gradient worth mention; indeed, the 2½ miles at 1 in 200 north of Blankney and the 1¾ miles at the same inclination from Stow Park to Lea, are the only lengths as steeply inclined as this for the whole of some 200 miles northwards by this route from Cambridge through Ely, March, Lincoln, Doncaster and York to Darlington. But there are bad curves and severe service slacks through most of the important towns *en route*, including Ely, March, Spalding, Lincoln, Gainsborough, the bridge over the Trent north of the last-mentioned town (shared with the old Great Central main line from Retford to Grimsby), and Black Carr Junction, near Doncaster. A stop at Sleaford, made by most of the expresses over this route, necessitates a diversion for just over 2 miles between the South and North Junctions.

The Lincoln and Retford line has some



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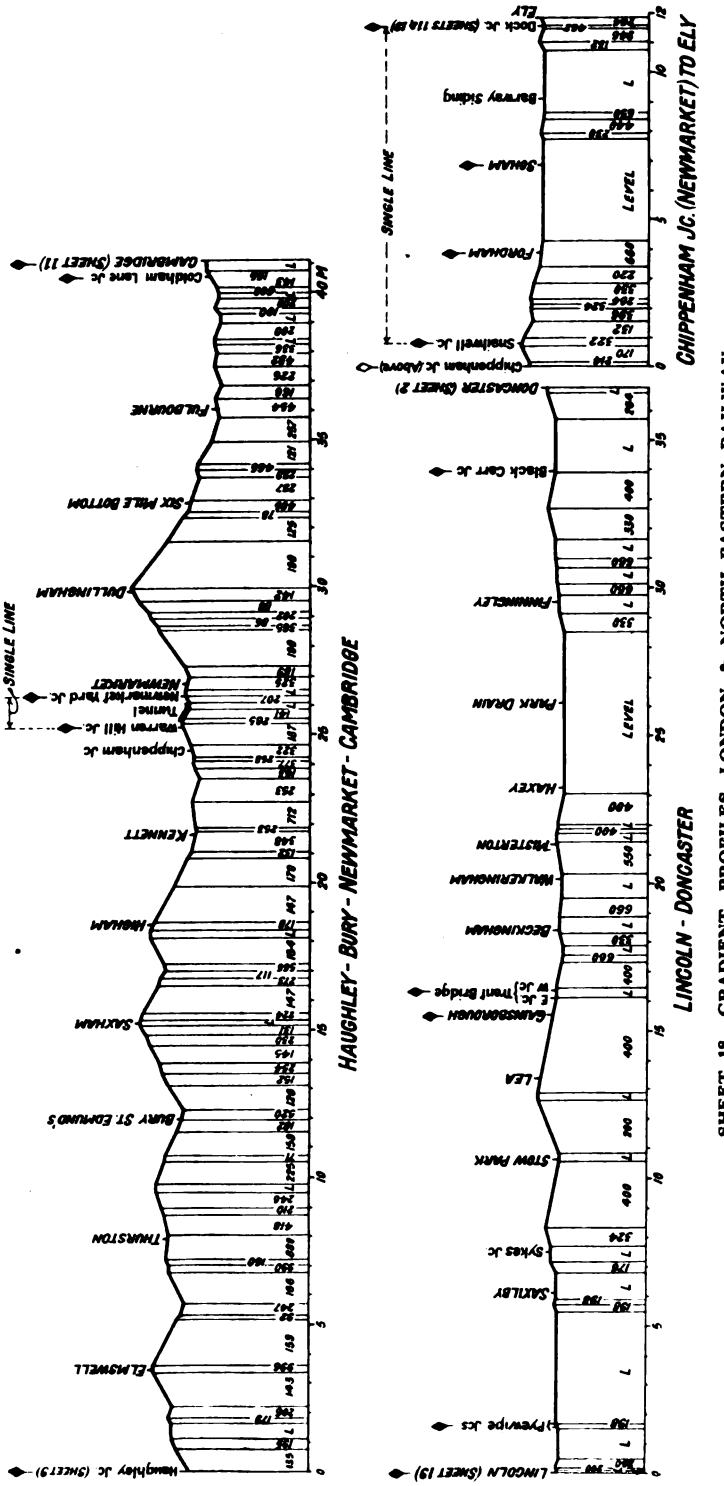


SHEET 18.—GRADIENT PROFILES, LONDON & NORTH EASTERN RAILWAY.

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heavy gradients up to and down from Clarborough Junction, where the Grimsby main line is joined, but the timings of the " North Country Continental " over this section, as pointed out in the April instalment of " British Locomotive Practice and Performance," are exceptionally easy.

### (5) *DONCASTER TO HULL.*

Little need be said concerning this short and easy stretch of line. It is used daily by one direct express to and from King's Cross, worked by the North Eastern Area, and the through fast trains between Liverpool, Manchester, Sheffield and Hull, for which the Great Central Section finds locomotive power. After passing through Goole and over the swing-bridge spanning the Aire, the line joins at Staddlethorpe the main Selby-Hull route, previously described. It is, as will be seen, practically level throughout.

### (6) *YORK TO HULL.*

A certain amount of express running takes place over this route daily, the chief train concerned being the corridor restaurant-car express which makes a return journey between Newcastle and Hull. The line has to cross some high ground between Market Weighton and Beverley, the worst bank being the descent of 5¾ miles from beyond Kipling Cotes past Cherry Burton almost to Beverley, of which 4¾ miles are at between 1 in 151 and 1 in 183.

### (7) *HULL TO BRIDLINGTON AND SCARBOROUGH.*

The only fast running over this line is performed by the moderately weighted business trains into Hull in the morning and out in the evening. As far as Beverley the route is the same as that followed by York trains; the Beverley to Driffield section has not been profiled, but is virtually level, the only appreciable gradients being 1½ miles up at 1 in 468 past Hutton Cranswick and a further mile up at 1 in 291 between there and Driffield. At Driffield the Selby to Bridlington route, already profiled on Sheet 7, is joined; the remainder of the course to Scarborough appears on Sheet 20. It is very steep, in particular the tremendous climb straight out of Bridlington, with its 5 miles continuously at 1 in 92, in singular contrast to the flatness of the route up to this point. The subsequent descent past Hunmanby is more broken and easier, boasting nothing steeper than 3¼ miles at between 1 in 106 and 1 in 112.

## DISTANCES.

**HITCHIN to Cambridge (Sheet 17).**

*Mile-posts, down side, from zero at King's Cross.*

| | Miles. |
|---|---|
| HITCHIN | 0.0 |
| Letchworth | 2.6 |
| Baldock | 4.7 |
| Ashwell | 9.1 |
| ROYSTON | 13.0 |
| Meldreth | 16.0 |
| Shepreth | 17.9 |
| Foxton | 19.0 |
| Harston | 20.7 |
| *Shepreth Branch Junction* | 23.4 |
| CAMBRIDGE | 26.0 |

**PETERBOROUGH to Boston, Skegness, and Grimsby (Sheet 17).**

*Mile-posts, down side, from zero at King's Cross.*

| | Miles. | Miles. |
|---|---|---|
| PETERBOROUGH | | 0.0 |
| *Werrington Junction* (down) | | 3.1 |
| Peakirk | | 5.4 |
| Deeping St. James | | 7.1 |
| Littleworth | | 11.4 |
| *Hawthorn Bank* (up) | | 15.7 |
| SPALDING | | 16.6 |
| Surfleet | | 20.6 |
| Algarkirk and Sutterton | | 24.3 |
| Kirton | | 27.1 |
| *Sleaford Junction* (up) | | 30.5 |
| BOSTON | | 31.0 |
| *Grand Sluice* (up) | | 31.2 |
| Sibsey | | 35.7 |
| Old Leake | | 37.4 |
| East Ville | | 40.6 |
| Little Steeping | Miles. | 43.9 |
| *Firsby South Junction* | 45.7 | 45.7 |
| Thorpe Culvert | 47.9 | |
| Wainfleet | 49.8 | |
| Haverhouse | 51.6 | |
| Seacroft | 53.6 | |
| SKEGNESS | 54.8 | |
| FIRSBY | | 46.1 |
| Burgh-le-Marsh | | 48.1 |
| Willoughby | | 51.7 |
| Alford Town | | 54.2 |
| Aby | | 57.4 |
| Authorpe | | 58.6 |
| Legbourne Road | | 62.1 |
| LOUTH | | 64.7 |
| Ludborough | | 70.0 |
| North Thoresby | | 71.6 |
| Holton-le-Clay | | 73.5 |
| Waltham | | 75.6 |
| GRIMSBY TOWN | | 78.7 |



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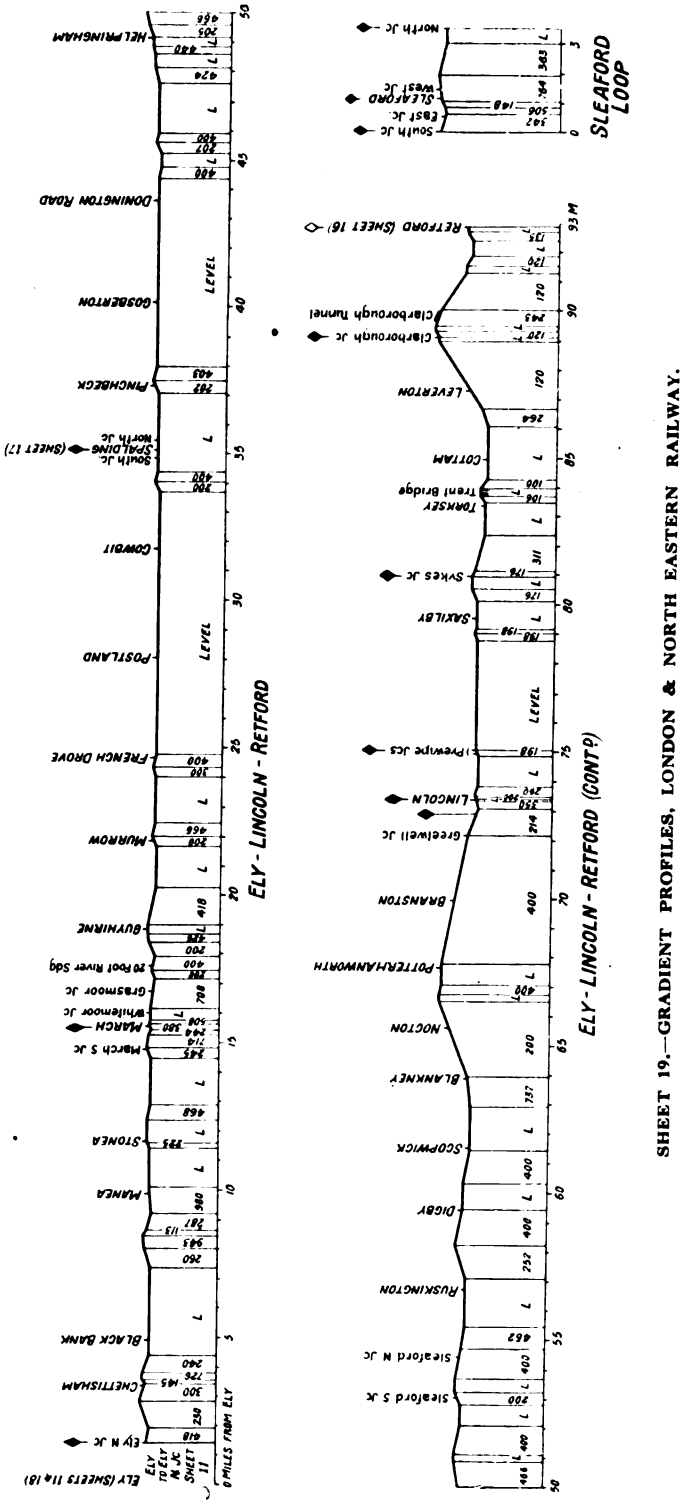


SHEET 19.—GRADIENT PROFILES, LONDON & NORTH EASTERN RAILWAY.

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## HAUGHLEY to Bury, Newmarket and Cambridge, also Chippenham Junction to Ely (Sheet 18).

*Mile-posts, north side (officially the down side of line) from Haughley Junction to Cambridge (zero).*

| | Miles. | |
|---|---|---|
| HAUGHLEY WEST | 0.0 | |
| (From Ipswich, 14.2 miles) | | |
| ( ,, Harwich, 34.3 ,, ) | | |
| *Haughley Junction* (down) | 0.2 | |
| Elmswell | 3.6 | |
| Thurston | 8.1 | |
| BURY ST. EDMUNDS | 12.2 | |
| Saxham and Risby | 15.4 | |
| Higham | 18.8 | |
| Kennett | 21.9 | |
| | Miles. | |
| *Chippenham Junction* (down†) | 24.7 | 24.7 |
| *Snailwell Junction* (down) | 25.5 | |
| Fordham | 28.5 | |
| Soham | 31.5 | |
| *Barway Siding* (up) | 33.8 | |
| *Ely Dock Junction* (down*) | 36.3 | |
| ELY | 36.6 | |
| *Warren Hill Junction* | 25.6 | |
| *Newmarket Yard Junction* | 26.6 | |
| NEWMARKET | 26.9 | |
| Dullingham | 30.0 | |
| Six Mile Bottom | 32.8 | |
| Fulbourne | 36.2 | |
| *Coldham Lane Junction* | 40.8 | |
| CAMBRIDGE | 41.4 | |

*On up side of main line from Cambridge.
†Officially on up side (see note above).

## ELY (and Norwich) to March (Sheet 19).

*Mile-posts, down side (zero at Liverpool Street).*

| | Miles. | |
|---|---|---|
| ELY | 0.0 | |
| *Ely North Junction* (up) | 1.4 | |
| | Miles. | |
| NORWICH THORPE | 0.0 | |
| *Ely North Junction* (*via* Ely South Curve) | 52.3 | |
| *Ely West Junction* (up) | 53.3 | |
| Chettisham | 54.5 | 3.3 |
| Black Bank | 56.1 | 4.9 |
| Manea | 61.0 | 9.8 |
| Stonea | 62.8 | 11.6 |
| MARCH | 66.8 | 15.6 |

## MARCH to Lincoln, Retford and Doncaster (Sheets 18 and 19).

*Mile-posts, down side, March to Black Carr Junction, Doncaster, from zero at Huntingdon, via St. Ives (late Great Northern and Great Eastern Joint Line); and up side Sykes Junction to Retford (from zero at Manchester, London Road).*

| | Miles. | |
|---|---|---|
| MARCH | 0.0 | |
| *Whitemoor Norwood Junction* (down) | 0.0 | |
| *Grasmoor Junction* (up) | 1.1 | |
| *Twenty Feet River* (down) | 2.0 | |
| Guyhirne | 3.3 | |
| Murrow | 6.3 | |
| French Drove | 9.1 | |
| **Postland** | 12.5 | |
| Cowbit | 16.2 | |
| SPALDING | 19.6 | |
| Pinchbeck | 21.7 | |
| Gosberton | 24.6 | |
| Donington Road | 28.1 | |
| Helpringham | 33.6 | |
| | Miles. | |
| *Sleaford South Junction* (down) | 37.5 | 37.5 |
| SLEAFORD | 38.6 | |
| *Sleaford North Junction* (up) | 41.0 | 38.9 |
| Ruskington | 43.2 | 41.1 |
| Digby | 45.9 | 43.8 |
| Scopwick and Timberland | 48.0 | 45.9 |
| Blankney and Metheringham | 50.4 | 48.3 |
| Nocton and Dunston | 52.1 | 50.0 |
| Potterhanworth | 54.1 | 52.0 |
| Branston and Heighington | 56.4 | 54.3 |
| *Greetwell Junction* (up) | 58.7 | 56.6 |
| LINCOLN | 59.9 | 57.8 |
| *Pyewipe Junction* (down) | 59.5 | |
| Saxilby | 64.0 | |
| | Miles. | |
| *Sykes Junction* (down) | 65.4 | 65.4 |
| Torksey | 67.8 | |
| Cottam | 69.4 | |
| Leverton | 71.7 | |
| *Clarborough Junction* (down) | 73.5 | |
| *Retford South Junction* (up¶) | 77.6 | |
| *Whisker Hill Junction* (up) | 78.1 | |
| WORKSOP (Sheet 15) | 85.3 | |
| SHEFFIELD | 100.2 | |
| Stow Park | 68.4 | |
| Lea | 71.2 | |
| GAINSBOROUGH (LEA ROAD) | 73.4 | |
| *Trent Junction* | 73.9 | |
| Beckingham | 76.2 | |
| Walkeringham | 78.0 | |
| Misterton | 79.1 | |
| Haxey and Epworth | 81.1 | |
| Park Drain | 83.9 | |
| Finningley | 87.4 | |
| *Black Carr Junction* (down) | 91.8 | |
| DONCASTER | 94.6 | |

¶Level Crossing with East Coast main line.

## HULL to Bridlington and Scarborough (Sheets 7 and 20).

*Mile-posts, down side, Hull (zero) to Scarborough.*

| | Miles. |
|---|---|
| HULL | 0.0 |
| Cottingham | 4.0 |
| BEVERLEY | 8.3 |
| Arram | 11.2 |
| Lockington | 13.0 |
| Hutton Cranswick | 16.3 |
| DRIFFIELD | 19.5 |
| Nafferton | 21.6 |
| Lowthorpe | 23.8 |
| Burton Agnes | 25.6 |
| Carnaby | 28.7 |
| BRIDLINGTON | 30.9 |
| Flamborough | 33.3 |
| Bempton | 34.5 |
| Speeton | 37.4 |
| Hunmanby | 41.7 |
| FILEY | 44.4 |
| Gristhorpe | 46.5 |
| Cayton | 48.2 |
| Seamer | 50.9 |
| SCARBOROUGH | 58.8 |

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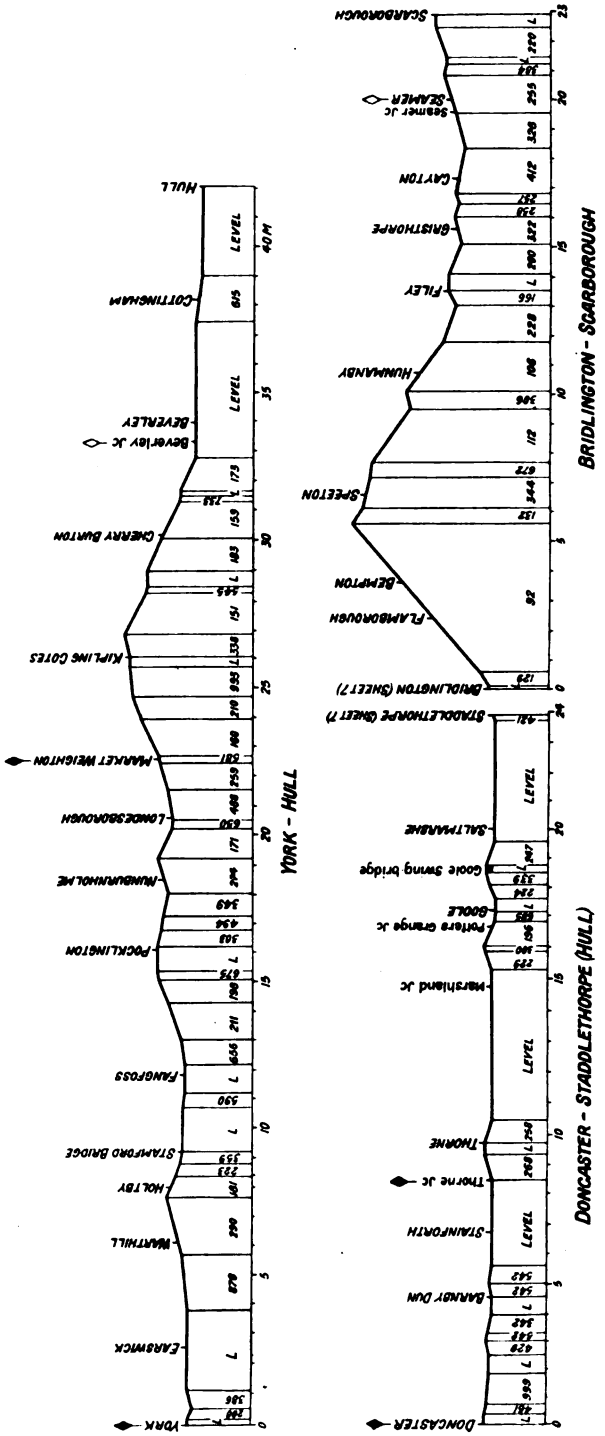


SHEET 20.—GRADIENT PROFILES, LONDON & NORTH EASTERN RAILWAY.

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**DONCASTER to Hull (Sheet 20).**

*Mile-posts, down side, Doncaster to Thorne Junction, and up side, Thorne Junction to Hull.*

| | Miles. |
|---|---|
| DONCASTER | 0.0 |
| Barnby Dun | 4.6 |
| Stainforth and Hatfield | 6.8 |
| *Thorne Junction* | 8.4 |
| Thorne (North) | 9.7 |
| *Marshland Junction* | 14.7 |
| GOOLE | 17.2 |
| Saltmarshe | 20.2 |
| Staddlethorpe | 23.9 |
| Broomfleet | 26.4 |
| Brough | 30.4 |
| Ferriby | 33.4 |
| Hessle | 36.1 |
| *Anlaby Road Junction* (up) | 40.0 |
| HULL (PARAGON) | 40.9 |

**HULL to York (Sheet 20).**

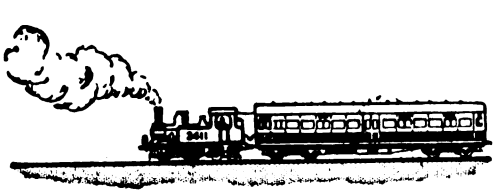
*Mile-posts, down side, Hull (zero) to Beverley, and down (north) side, Beverley to York (zero). The relation of up and down roads is reversed from Beverley onwards.*

| | Miles. |
|---|---|
| HULL | 0.0 |
| Cottingham | 4.0 |
| BEVERLEY | 8.3 |
| Cherry Burton | 12.0 |
| Kipling Cotes | 16.1 |
| MARKET WEIGHTON | 19.7 |
| Londesborough | 21.6 |
| Nunburnholme | 23.6 |
| POCKLINGTON | 26.1 |
| Fangfoss | 30.3 |
| Stamford Bridge | 33.0 |
| Holtby | 34.2 |
| Warthill | 36.1 |
| Earswick | 39.7 |
| YORK | 42.2 |

# ISLE OF WIGHT RAILWAY NOTES.

MR. C. G. WOODNUTT sends the following notes in regard to the present conditions on the Southern Railway lines in the Isle of Wight:—" A considerable alteration in whistles has recently taken place, the Adams tanks working on the Ryde-Ventnor section having had their whistles opened to a tone very much like the old Great Central, while W24-31 of the same class, working from Newport shed, have still the well-known L. & S.W. tone. W13 *Ryde* and W16 *Wroxall,* which work the Brading Harbour branch, are now fitted with hooters—a most unusual whistle from that of Isle of Wight Railway engines, and reminding one very much of that of the old Isle of Wight Central Company. All engines passing through Ryde shops are being turned out with red number-plates on the back of the bunker. Engines so treated are Nos. 1, 2, 13, 19, 20, 22, 23, 24, 28 and 32. In some cases the number-plate is bordered by a thick black and thin white line, to harmonise with the name-plate borders. All engines are now to carry the number on the bunker sheet instead of the tanks. At the time of writing, No. W25 (0-4-4T) is in Ryde Works for heavy repairs, this being the first time since it came to the Island, in June, 1925.

" The ' eight-wheeled Metropolitan Coaches ' have been laid by all the winter (they are not steam heated), but some will probably be used to help out the Easter holiday traffic. These cars were exceedingly well upholstered and most comfortable, thanks to the I.W.R., which always knew how to turn out a well-cushioned carriage. Their tare weight is 17 tons, and, as the brake gear was only the same as that fitted to the old I.W.R. four-wheelers of 1864 (distinguished by their blue upper lights), considerable difficulty is experienced in bringing a train to a stand, mainly owing to the brake on the Adams tanks now being so quick in action as on the former I.W.R. engines. Work has now been started on the new running shed at Ryde, to be built on the site of the present goods yard. Travel in the Island now is very cheap, and more up-to-date and punctual than in a good many parts of the country, considerable surprise being shown if a train is the least bit overdue, every consideration, of course, being given to the late running of the steamers."



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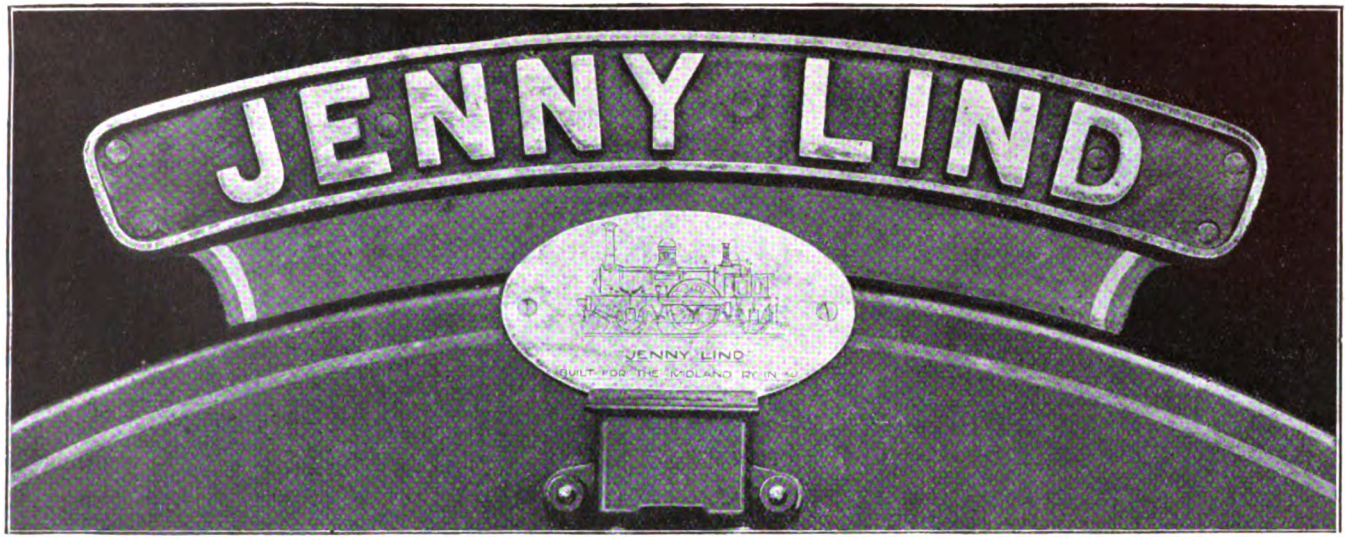


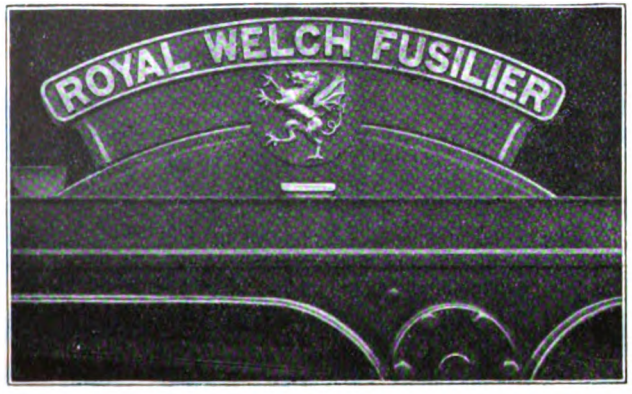


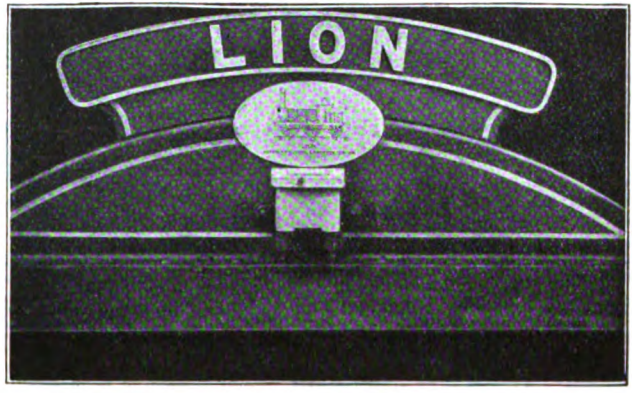


HISTORIC LOCOMOTIVES AND REGIMENTAL NAME PLATES, ETC., "ROYAL SCOT" LOCOMOTIVES, L.M.S.R.

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# "Royal Scot" Locomotives, L.M.S.R.

SIR HENRY FOWLER, K.B.E., Chief Mechanical Engineer, London Midland & Scottish Railway, has hit upon the happy idea of further perpetuating locomotive history by the addition of brass plates bearing an imprint of one or other of the early locomotives to engines of the "Royal Scot" class bearing the same names. Two examples are illustrated, one showing the nameplate of No. 6146, *Jenny Lind*, with below it the plate on which is engraved a line representation of the engine of the same name built for the Midland Railway in the year 1847.

Several other pioneer locomotives, including *Sanspareil, Novelty, Liverpool* and others, have been dealt with in a similar fashion, and perhaps no better or more convenient manner of marking the enormous difference between the original engines, and the modern products bearing the same names, could have been devised. Very considerable interest is aroused among passengers, whose notice is thus attracted.

Several of the regiments, after which the remaining "Royal Scots" are named, have been so interested that they submitted the military badges of the regiments for attachment to the respective locomotives. That of the *Royal Welch Fusilier* is shown in one of the illustrations.

THE ARMY ENGINES.

No. 6100, **Royal Scot.**
No. 6101, **Royal Scots Grey.**
No. 6102, **Black Watch.**
No. 6103, **Royal Scots Fusilier.**
No. 6104, **Scottish Borderer.**
No. 6105, **Cameron Highlander.**
No. 6106, **Gordon Highlander.**
No. 6107, **Argyll and Sutherland Highlander**
No. 6108, **Seaforth Highlander.**
No. 6109, **Royal Engineer.**
No. 6110, **Grenadier Guardsman.**
No. 6111, **Royal Fusilier.**
No. 6112, **Sherwood Forester.**
No. 6113, **Cameronian.**
No. 6114, **Coldstream Guardsman.**
No. 6115, **Scots Guardsman.**
No. 6116, **Irish Guardsman.**
No. 6117, **Welsh Guardsman.**
No. 6118, **Royal Welch Fusilier.**
No. 6119, **Lancashire Fusilier.**
No. 6120, **Royal Inniskilling Fusilier.**
No. 6121, **H.L.I.**
No. 6122, **Royal Ulster Rifleman.**
No. 6123, **Royal Irish Fusilier.**
No. 6124, **London Scottish.**

THE PIONEER ENGINES.

(*With notes as to original engines.*)

No. 6125, **Lancashire Witch.** Built by Robert Stephenson in 1828, for the Bolton & Leigh Railway.

No. 6126, **Sanspareil.** With the *Novelty* and the *Rocket* completed at Rainhill in 1829. Built by Timothy Hackworth.

No. 6127, **Novelty.** Built by Braithwaite & Ericson for the Rainhill trials in 1829.

Nos. 6128, 6129 and 6132, **Meteor, Comet and Phœnix.** Named after engines built by R. Stephenson & Co. in 1830 for the opening of the Liverpool & Manchester Railway.

No. 6130, **Liverpool.** Built by Edward Bury, of Liverpool, in 1830.

No. 6131. **Planet.** 2-2-0, built by R. Stephenson in 1830.

No. 6333, **Vulcan,** 2-2-0, built by Fenton & Murray, of Leeds, in 1831.

No. 6134, **Atlas.** 0-4-0, built by R. Stephenson for the Liverpool & Manchester Railway.

No. 6135, **Samson.** 0-4-0, built by R. Stephenson for the Liverpool & Manchester Railway in 1831.

No. 6136. **Goliath.** Similar to *Samson* above.

No. 6137, **Vesta.** Built by R. Stephenson & Co., in 1832, for the Liverpool & Manchester Railway.

Nos. 6138 and 6139, **Fury and Ajax.** Sister engines to the *Planet*, the first built by Fenton & Murray, in 1831, and the second by R. Stephenson in 1832.

No. 6140. **Hector.** 0-6-0, built in 1832 by the Haigh Foundry Company, of Wigan, for the Leicester & Swannington Railway.

No. 6141, **Caledonian.** 0-4-0, built by Galloway, Bowman & Co., of Manchester, in 1832, for the Liverpool & Manchester Railway.

No. 6142, **Lion.** 0-4-2, built in 1838 by Tod Kitson & Laird, of Leeds, for the Liverpool & Manchester Railway.

No. 6143, **Mail.** 2-2-2, built for the Midland Counties Railway in 1840 by Robert Stephenson & Co.

No. 6144, **Ostrich.** 2-2-0, built in 1842 at the Liverpool & Manchester Railway's Works.

No. 6145, **Condor.** Sister engine to *Ostrich*, and built in 1845.

No. 6146, **Jenny Lind.** 2-2-2, designed by David Joy for the Midland Railway. Built by E. B. Wilson & Co., of Leeds, in 1847.

No. 6147, **Courier.** 4-2-0 "Crampton," built at the L.N.W.R. Crewe Works in 1847.

No. 6148, **Velocipede.** 2-2-2, designed by Alexander Allan, and built at Crewe for the L.N.W.R. in 1847.

No. 6149, **Lady of the Lake.** 2-2-2, designed by John Ramsbottom and built at Crewe for the L.N.W.R. in 1857.



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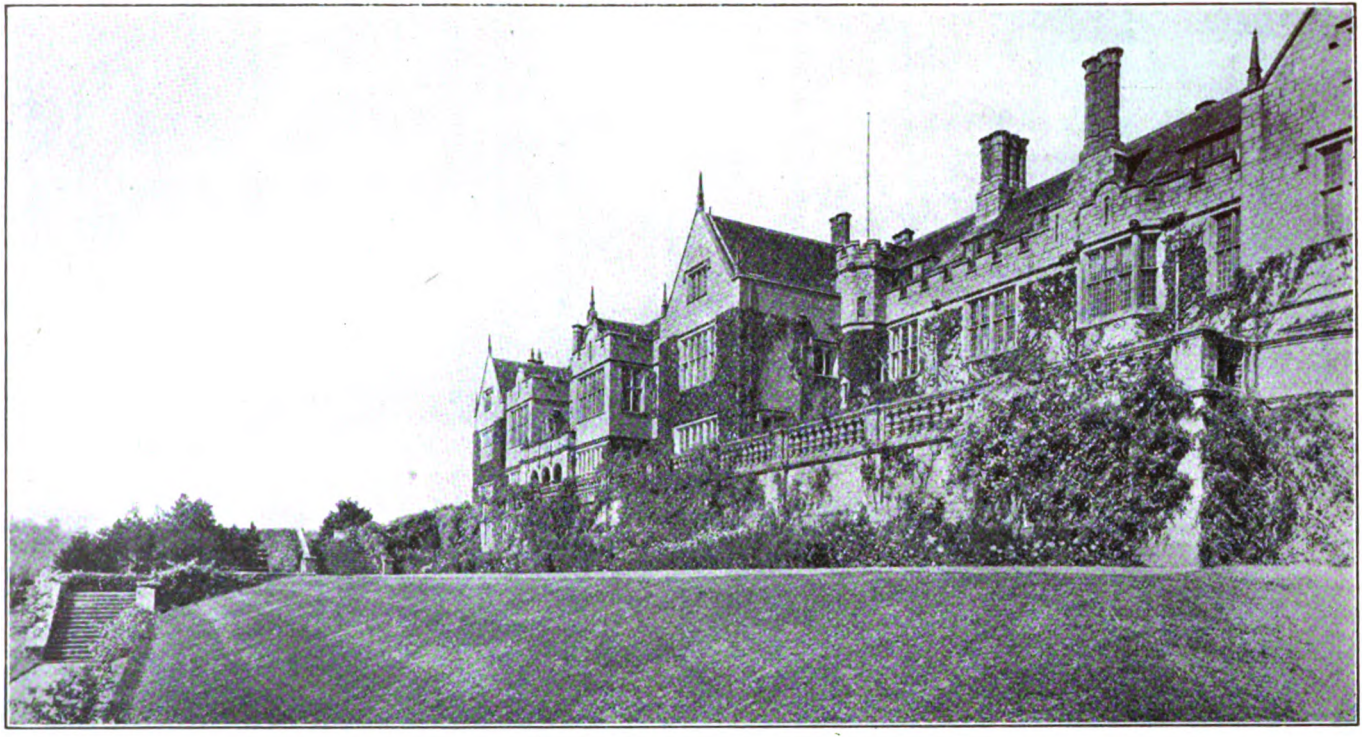
# NEW G.W.R. COUNTRY HOTEL.



As foreshadowed by Viscount Churchill, in his speech at the G.W.R. annual meeting, the company have decided to extend their activities as hotel proprietors. North Bovey Manor is the first mansion to be purchased for this purpose. It is two miles from Moreton Hampstead, on the edge of Dartmoor, 700 ft. above sea level, and commands extensive and beautiful views from all parts of the 200-acres estate.

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RAILWAY MAGAZINE *readers desiring information should mark envelopes "Query" in the upper left-hand corner, and address them to the Editor. Questions relating to the dimensions and weights of railway rolling-stock and to names, numbers, dates, &c., of locomotives should not be forwarded. No reader should send more than two questions in one month. Correspondents are requested to write on one side of the paper only, and although they must give their names and addresses, pen-names or initials may be inserted for Editorial use. Before asking for information concerning railway history or "grouping," the pages of the "Railway Year Book" (5s. net) should be consulted. The thirty-first Annual Edition (1928) of this standard railway reference work is now published. All previous Editions are out of print.*

**Rail-Lengths.**

It is difficult to give any precise figure, owing to the constant changes in the standards of length which are worked to. The future British standard length of rail is to be 60 ft., which has for many years been in use and is practically universal on the Western Division of the L.M.S. Up to the present, however, it is only in the early stages of being laid over the rest of that system, or over the L.N.E. or G.W. Railways. The most commonly employed length on the L.N.E. and Southern Railways is 45 ft. and on the Great Western 44 ft. 6 in., interspersed at occasional intervals with 30 ft. on the former and 32 ft. on the latter. Apart from 60 ft., the Midland Division of the L.M.S. has 36 ft. largely in use as well as 45 ft., and the Caledonian Section 48 ft. and 32 ft., while the Glasgow and South Western Section has employed chiefly 45 ft. rails. The North British Section of the L.N.E.R. has 40 ft. and 48 ft. rails in the road in considerable numbers. It needs the ear of the expert precisely to determine what length is in use from the rhythm of the wheels passing over the rail-joints.

[Reply to "F. Y. and N."]

**Aynho Junction, Banbury.**

By the "loop going off the main line between Banbury and Ardley," Great Western Railway, we assume you refer to Aynho Junction. The original main line from Paddington to Birmingham *via* Oxford is the straight line here, the down line of the much more recent Bicester route (the present main line) flying over the old up and down lines to come in at Aynho Junction. Looking south at Aynho, therefore, the Oxford lines are in the centre, the up direct line to London leaves on the left, and the down line from London flies over to come in on the right. The only other junction between Banbury and Ardley is that of the Banbury and Cheltenham line, leaving on the west side at King's Sutton.

[Reply to J. N. W. CHAMBERS.]

**Railway Gradients.**

It is not, perhaps, so remarkable as you imagine that long accepted figures as to railway gradients over any particular route should be subject to modification in later years. Circumstances may occur to cause variation in gradients, such as settlements of embankments as they consolidate, packing and repacking of track on new ballast, spread over a long course of years, and varying in amount at different points according to the relative attention that has been paid in this matter to different stretches of line. We have known many cases of profiles substantially modified in later years, as a result of re-levelling with the precise surveying instruments of to-day.

[Reply to W. B. THOMPSON.]

**Pullman Cars.**

We do not know how you can possibly have deduced that the figures given in the tables of "British Express Train Services



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in the Summer of 1928" in regard to Pullman Car services represented the number of *cars* in use. The head of the columns concerned distinctly states "Pullman Car Trains," and on short-distance journeys like those of the Southern between Victoria and Brighton the same cars may be responsible for working four or more trains in the one day, as was indicated in the text of the article. Conversely, on trains like the "Southern Belle," as many as ten Pullman cars may be worked in the same train.

[Reply to F. G. ELLIOTT.]

**The "Queen of Scots," L.N.E.R.**

Between London and Leeds the engine of this train is usually a Great Northern "Atlantic," although occasionally a Great Central type 4-4-0 "Director" is employed, and one of the 3-cylinder 4-4-0 "Shires" has also worked it recently. North of Leeds either a "Pacific" or a North Eastern 3-cylinder "Z" class "Atlantic" takes charge, as far as Edinburgh, the remainder of the run to Glasgow being entrusted to a "Director" or a "Shire." The gradients of the whole route between London and Edinburgh have appeared in the January and February issues this year, and to these we must refer you.

[Reply to A. T. SHAUGHNESSY.]

**"Singling" of Double Routes.**

Conversion from double to single track of the old Midland and South Western Junction line (now Great Western) between Swindon Town and Andoversford Junction, Cheltenham, has been carried out with a view to reducing the costs of maintenance, both in material and the staff required for supervision. It is one of a number of similar conversions carried out during recent years, and a considerably more extensive "singling," now in progress, is that of the entire Midland Great Western main line of the Great Southern Railways of Ireland.

[Reply to J. N. W. CHAMBERS.]

**Aylesbury Line, Metropolitan and L.N.E.R. Joint.**

Presumably, the 2-8-0 you noted near Moor Park had been working on local goods traffic on behalf of the L.N.E.R., or it may have been travelling via Aylesbury as a matter of traffic convenience. We cannot say, without inquiring or studying the timetables, whether the 9.25 a.m. from Leicester afterwards continues from Aylesbury to Marylebone or has a return working.

[Reply to B. K. Cooper.]

**Train Loads, L.M.S.R.**

We cannot discuss the train loads of particular classes of locomotives. These vary according to section of line and classes of train. Further, train loads are often governed by siding accommodation and how far the train can proceed without breaking up. No doubt the Garratts could haul 85-90 wagons, but such trains could probably be dealt with only on straightforward main-line stages because of their length.

[Reply to F. V. W.]

**Fixing Locomotive Boilers.**

The boiler of a locomotive is in three parts, the smoke-box, the fire-box, and the barrel which joins the two former together. In many cases the only support is that of the smoke-box and fire-box, both of which are securely bolted to the main frames, the barrel being suspended between them. In the case of the larger and longer boilers, an additional support, bolted to the frames, is often provided for the barrel intermediately.

[Reply to F. C.]

**Railway Gauges.**

The gauge, or distance between the rails, of main lines in Great Britain and America is 4 ft. 8½ in. On the Continent of Europe generally the figure is 1.45 metres, or 4 ft. 9 in. in the British equivalent. Spain and Portugal have a gauge of 1.67 metres, of which the nearest British equivalent is 5 ft. 5¾ in. We have not the further information asked for.

[Reply to H. C. HORTON, F. C. and ALEX. T. BINNIE.]

**Locomotive Acoustics.**

The rhythmic beats made by certain locomotives when in motion, which you describe in detail, are probably those of vacuum brake ejectors worked off the engine cross-heads, which is a frequent

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method of exhausting the vacuum in British locomotives (additionally, of course, to steam vacuum ejectors). On all the lines mentioned by you the vacuum brake is in use.

[Reply to " L.C.D.R."]

**Highland Section, L.M.S.R.**

In reply to queries on page 320 of the April number, Major A. R. Munro writes:—" (1) The platform referred to by Mr. Pearson is situated about 3 miles south of Bonar Bridge station (between it and Edderton, not Eddeston); and serves the seat of Sir R. W. Brooke, Bart., of Mid Fearn. Stops are made by trains as and when required by arrangement with the Bonar Bridge station-master, or by notice to the guard when setting down passengers. (2) Regarding the Dingwall and Cromarty Light Railway, I would draw attention to a paragraph on page 152 of your number for February, 1926 (supplied by me), which gives the desired information."

[Reply to G. A. PEARSON and R.M. COMBER.]

**The Highest Station.**

Princetown, the Great Western passenger station on Dartmoor, holds the record for station altitude in England, being 1,373 ft. above sea-level. Stainmore, on the L.N.E.R. between Barnard Castle and Kirkby Stephen, is not a station but only a signal-box; further, it is 4 ft. lower in altitude.

[Reply to R. F. KIPLING.]

**Travelling Post Offices.**

Apart from the regular mail trains, there are a number of instances where Post Office mail vans are attached to trains. To give a list of these would, however require special inquiries to be instituted.

[Reply to W. F. Swift.]

**2-6-2 Tank Engines, Great Southern Railways, Ireland.**

Presumably, further engines of the " 850 " class will be built in due course, though we have no definite information as to whether this is the case as yet.

[Reply to R. A. JACKSON.]

**Sectional Release.**

Sectional release is a term used where lines are track circuited and means that the section of track circuit has released the signal concerned.

[Reply to " LIVERPOOL STREET."]

**Rebuilt " Claughton " Locomotives, L.M.S.**

We have no official information on either of the points raised.

[Reply to W. B. THOMPSON and EDWIN BURY.]

**Railway Cuttings and Embankments.**

We understand that chalk is placed on the sides of railway cuttings and embankments as part of the system of drainage.

[Reply to G.C.S.]

**Gradients.**

We have no information as to the gradients on the L.M.S. line from Murrayfield Station to Granton Road.

[Reply to " Cardean."]

**Lickey Incline.**

Goods trains are banked either by the 0-10-0 or by one or two 0-6-0 tank engines. Passenger trains are also banked.

[Reply to " CYTRINGAM."]

**Distances.**

From Stretton to Clay Cross, Midland Division, L.M.S., is 2 miles 47 chains between the centres of the stations.

[Reply to M. A. COURSE.]

**Hackney Downs, L.N.E.R.**

Gradient from Hackney Downs Tunnel up to Hackney Downs Junction is 1 in 75.

[Reply to H. VYVYAN.]

**Cambridge Station.**

Length of the main up and down platform is a little under 1,700 ft.

[Reply to H. VYVYAN.]

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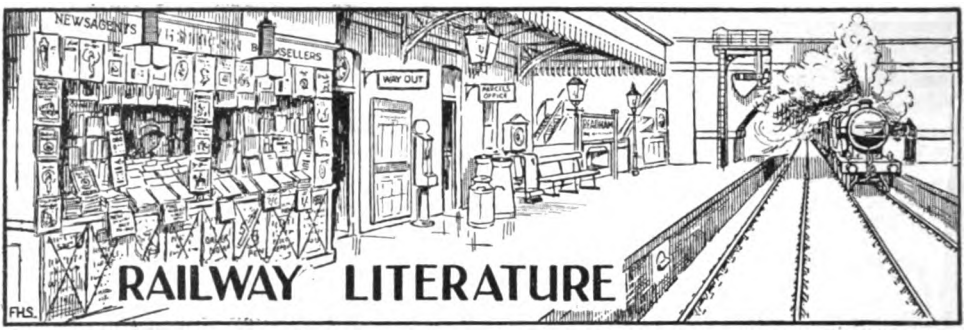


RAILWAY ELECTRIFICATION AND TRAFFIC PROBLEMS. By Philip Burtt. With a Foreword by Frank Pick. [London: Sir Isaac Pitman & Sons, Ltd., Parker Street, Kingsway, W.C.2. Price 10s. 6d. net.]

Mr. Pick, who contributes a foreword, is not unnaturally a robust believer in electrification as a cure for railway ills. He thinks the problem is probably the most important which confronts the main-line railways of this country, but the answer was settled in principle some time ago, and all that remains to be debated is the detail of ways and means. The book has sixteen chapters, but is nevertheless short and eminently readable, and is written in non-technical language throughout. After "some thoughts from the past," Mr. Burtt deals with the present position; engineering and traffic problems; suburban electrification on Tyneside; electrical railways in Holland; frequency of service; the factor of speed; main-line electrification; problems of the Underground Railway; effect on signalling; types of passenger carriage stock; electrical working of goods trains; the Southern Railway; and the Swiss Federal Railways. In the two final chapters he discusses the progressive development of traffic, which he describes as the problem of problems, and the question of cost. The travel habit, Mr. Burtt contends, is growing steadily year by year among all classes of the community, and will continue to grow. In electrification the railway companies have the surest and most powerful means of promoting the growth of travel by rail, since such development has always followed electrification. He quotes many examples and figures in support of this statement, and suggests among the possibilities of further development the case of the northern zone round London within a radius of 20 to 30 miles which, with the exception of Watford, has no electric service. As a concrete case, he suggests the electrification of the Midland line to St. Albans, Harpenden and Luton, but only as illustrative of what might be done in many directions all over the country. Finally, he goes into the question of cost, but is strongly of opinion that the large capital expenditure essential should not be shirked; it is a sign of enterprise and progress, and, moreover, has always been justified. The cheap electric power which will come with the completion of the national scheme, when the bars of the grid will largely follow the railway lines, will greatly assist the policy of electrification, and enable the countryside to be developed, especially with simpler light railway legislation; but he urges the railway companies to take up the policy vigorously without delay as the chief means of recovering and extending their traffic.

THE RAILWAY YEAR BOOK: 1929. Thirty-Second Annual Edition. [The Railway Publishing Co., Ltd., 33, Tothill Street, Westminster, London, S.W.1. Price 5s. nett, by post 5s. 6d. Ready in a few days.]

While maintaining all standard features, in some cases with a degree of development, the 1929 volume, the Thirty-Second Annual Edition, is characterised by several important additions and changes. Hitherto attention has been confined almost exclusively to British railways, or, in the case of lands overseas, to railways in Colonies, Dominions, Protectorates, etc., with countries, particularly the South American and Central American States, where British enterprise has been, and is, largely concerned in the construction and operation of railways. There have, however, been many requests that attention should be given to European, United States and other railways, and in the present volume new sections have been added which go some way to meet requirements in this connection.

The new European section is classified according to States, and under each heading particulars are given of the principal railways, with some notes as to gauge, numbers of locomotives, coaching vehicles and freight stock, and the headquarters. In the case of United States Railways, a full list, with general particulars, is given of all the principal (Class 1) railways. This



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section is prefaced by general statistics indicating the scale of operation and main particulars of United States railways as a whole. It is thought that the additional information thus given will be useful for general reference, though for more extended information readers must still be referred to other works, which deal with them in detail.

Opportunity has also been taken to replace the tabular statements in previous editions in regard to non-British railways in various countries by new sections covering the same ground in a different and more convenient manner, and in doing so considerable additions have been made to the information hitherto given. These remarks apply particularly to the Asiatic (except India), African (revised as compared with last year's edition), and Central and South American sections.

In the home railway and general sections, extensive revisions have been made, all recent developments are adequately covered, essentially up-to-date statistics are given, and the particulars based upon the railway companies' annual reports have been amplified, especially in regard to joint railways. There is only one new map, that of the Southern Railway, but the volume as a whole received systematic attention throughout, so as to cover the latest changes, developments and statistics. It thus continues to merit its claim to be the "Whittaker" of the Railway World. The "Who's Who" and "Railway Bibliography" sections have, of course, shared to the full in such revision, correction and amplification.

"THE TRACK OF THE TWENTY-FIVES." By Edmund Vale. [L.M.S. Route Book No. 5. Obtainable at Euston and bookstalls. Price 1s.]

This is the fifth of the series of route books issued by the London Midland & Scottish Railway, and deals with what can been seen from the carriage window on a journey from St. Pancras to Manchester. The "Twenty-fives" are, of course, the expresses which leave St. Pancras at 8.25, 10.25, 12.25, 2.25, 4.25, 6.25 and 8.25 daily. The first portion of the book gives a picture of the line in diagrammatic form, with notes alongside the diagrams giving "snapshot" information on points of interest. A station index is given, and at the end there is a full-page diagram of the route covered. The author tells his story interestingly, and not without a touch of humour. The pen-and-ink sketches by Mr. R. M. Hutchings add greatly to the book's attractiveness.

HINTS FOR HOLIDAYS.—The 1929 edition of the Southern Railway's holiday guide book has just been published, and we are not surprised to learn that, as the demand for it increases every year, over 100,000 copies of the present edition have been printed. It is a wonderful sixpenny-worth, and covers an amazing stretch of territory in the south and south-west of England. Ranging from Kent to Cornwall, its 704 pages contain 12 useful district maps and hundreds of fine illustrations. The list of hotels, boarding-houses and apartments is bigger than ever, and includes details of holiday residences suitable for all purses, from palatial hotel to homely farm or cottage. Every conceivable item of information likely to be of use to the holiday-maker is included, a prominent feature being a complete list of the golf courses on the Southern Railway, with details of green fees, etc. The book can be had at any Southern Railway station or inquiry office, as well as from the railway bookstalls and tourist agencies. Copies (post free 10d.) can also be obtained from the Indoor Commercial Manager, London Bridge station, S.E.1.

CANADIAN PACIFIC RAILWAY.—The C.P.R. has issued an attractive illustrated booklet describing a number of holiday tours organised to Canada and the United States for the coming summer months. The tours range from an inexpensive three-weeks' trip, taking in visits to Quebec, Montreal, Ottawa, Toronto, Niagara Falls, etc., to a seven-weeks' *tour de luxe* to the Pacific Coast, when many of the chief beauty spots and places of interest in the Dominion will be visited. A copy of the booklet may be obtained, post free, on application to the Canadian Pacific Railway, 62-65, Charing Cross, London, S.W.1.

ELECTRIFICATION OF THE MUMBLES RAILWAY. The South Wales Transport Co., Ltd., is issuing an attractive souvenir in connection with the electrification of the Mumbles Railway. It takes the form of a 32-page booklet containing a most interesting account of the Swansea & Oystermouth Railway—or, as it is more familiarly called, the Mumbles Railway—together with a number of illustrations showing the site and progress of the line. On one of the inside pages of the picture cover is a map of Swansea Bay showing, in red, the route plan of the railway.

"SPEED IN TRANSPORT." This is the title of a well-written and nicely-illustrated brochure issued by the Great Western Railway Company and presenting to the trading community a few facts relative to the enlarged arrangements which the company

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has developed with the object of keeping pace with business requirements. Warehouse facilities, railhead distribution, goods train transits and other points affecting the trader's transport problems are among the matter dealt with. The brochure runs to 100 pages and a fine folding map of the G.W.R. system is included.

DISTRIBUTION PROBLEMS SOLVED BY THE L.N.E.R. This booklet of 104 pages was specially compiled for distribution at the railway companies' container exhibit at the British Industries Fair at London and Birmingham. Briefly, it contains what are virtually short and lucid extracts of vigorous sales campaigns, based on an intensive use of the transport, storage and site facilities on the L.N.E.R., even to the point of the employment of "warehouses on wheels." There are many good and useful illustrations. A large part of the book consists of an alphabetical list of the goods stations and sidings owned or served by the L.N.E.R., and at the end is a folding map showing the company's system and connecting railways.

G.W.R. AND CONTINENTAL SAILINGS.—The Great Western Railway is issuing a folder relating to Continental sailings by ocean liner via Plymouth. Two ocean liners, it is emphasised, leave Plymouth every day throughout the year on an average, a large proportion being available for passengers who desire to make a short trip to the Continent. Approximately 8 hours is usually occupied from Plymouth to Havre or Cherbourg; 24 hours to Belgium and Holland; 36 hours to Germany. From most of the Continental ports boat specials run to and from the capitals in connection with the ships. The fares include all meals necessary and the provision of a cabin if the crossing is at night. Full details are given as to liners, dates of sailing, fares, &c.

ANNUAL OUTINGS BY THE L.N.E.R.—A neatly-printed 16-page pamphlet, which will be found useful by all secretaries of large organisations, has just been issued by the L.N.E.R. This pamphlet contains suggestions for 15 different day outings from the principal towns in the North of England, mentioning the fares, cost of meals, etc. The districts which can be visited include such varied selections as London, Scotland, the Lake District, Stratford-on-Avon, and the Belgian battlefields. The pamphlet can be obtained free from any L.N.E.R. agency.

*Photo.*] **L.M.S.R. No. 5964 "PATRIOT."** [*C. J. L. Romanes.*

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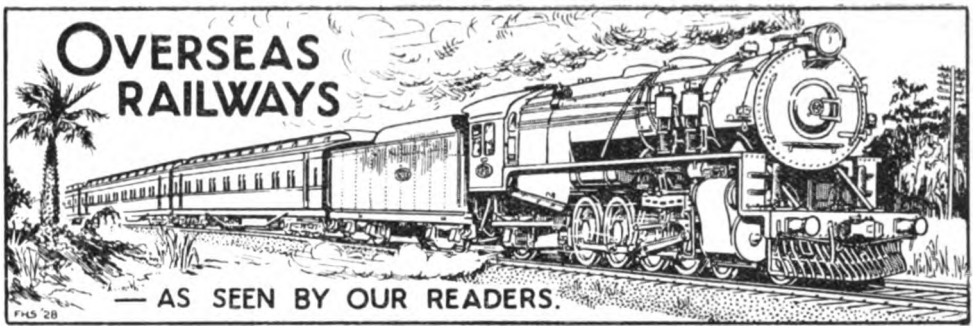


*Correspondence for this section, with or without photographs, is invited.*

### The "San Francisco Overland Limited."

I AM enclosing Overland Limited booklet describing the best train that runs between San Francisco and Chicago (distance about 2,300 miles) without change of cars, although travelling over the rails of three different railroads, viz., Southern Pacific, Union Pacific and Chicago & North Western. All railroads except the C. & N.W. are operated with right-hand movement. The C. & N.W., however, is operated with left-hand movement, the same as are the European railways.—[SYDNEY GILLIARD.]

The booklet sent by Mr. Gilliard has the following introduction:—"The San Francisco Overland Limited is the finest and fastest train between Chicago and the Golden Gate. An all-Pullman train, its handsomely appointed equipment includes sleeping cars with lower and upper berths, and compartments and drawing rooms so arranged that they may be used singly or en suite; a club car at the forward end of the train; library-observation car; and the famous Overland Route dining-car service. The shower bath is a pleasant privilege on a trans-continental journey. The train attendants include a maid, manicure, hairdresser, barber and valet. The air of quiet luxury and the spirit of ready service have made this train noted throughout the world. The richness of carpets, upholstery and finishings makes you imagine you are at a fine hotel or at your club. The courtesy of the selected train personnel completes your highest expectancy of what a *de luxe* train should be. The extra fare is ten dollars between Chicago and San Francisco." Detail descriptions are given of the Library-Observation Car, Correspondence Desk, Women's Dressing Room and Maid Service, Club Car, The Valet, the Barber Shop, Tonsorial Charges, Drawing Rooms and Compartments, Dining Car, the Shower Bath, and "About the Sleeping Cars." There are also a condensed timetable, plan of route, and plans of coaches.

### German Locomotives.

REFERRING to Mr. F. L. L. Jones's desire for further information on the running of former "State" locomotives on foreign lines in Germany (THE RAILWAY MAGAZINE for January, 1929), "Saxon" locomotives are very common in Berlin. The 1.50 p.m. and 10.50 p.m. Berlin-Vienna (via Dresden-Prague) have the three-cylinder Pacifics which Mr. Jones has seen at Anhalt station, Berlin. There are also "Saxon" 4-6-0 engines running on passenger trains from Dresden. The "Rheingold" express, which runs from Holland to Switzerland, has a four-cylinder Pacific of the Bavarian State Railways running from Zevenaar (Dutch-German frontier) to Mannheim, while the suburban trains from Munich are worked by former Prussian 4-6-4 tanks. In Nürnberg (Bavaria) I noticed last summer a "Prussian" three-cylinder 4-6-0 express engine of the 510.2 class, and a "Saxon" 2-8-2 compound express engine (four cylinders), while engines of the former P8 class are to be seen in all parts of Germany. —[L. RUTGERS VAN ROZENBURG.]

### Season Tickets in U.S.A.

AT last one American road has adopted our English form of season ticket; also cheap day tickets to New York for shoppers. I advocated both these plans to the Boston and Maine Railroad some months ago, but you will see that the New York Central is first in the field.—[ERIC CRICKMAY.]

The leaflet sent by Mr. Crickmay may be partially quoted as follows:—"For the greater convenience of our Commuters the following changes will be made in our Monthly Commutation and Fifty Trip Family tickets effective on January 1, 1929, except between New York and Harlem Division stations to and including



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White Plains North, where the changes will be made effective on February 1, 1929. These two effective dates are selected in order to avoid as much as possible congestion at our offices and inconvenience to our patrons in the furnishing of the new forms of tickets.

"The new ticket and new holder will be of photographic form. Photograph and signature of purchaser will be required on holder, and such holder with photograph will be good for an *indefinite period*—that is, as long as the holder is in good condition and the photograph identifies the purchaser. It will, therefore, not be easy to secure a new photograph or new holder each year as required under present regulations. The holder will provide place for inserting the ticket. Ticket will require signature of purchaser, which must correspond with signature on holder. Tickets will be of card form, will not require punching by conductor and are not limited as to number of rides. Ticket will be issued as usual for one calendar month or may be purchased for any number of calendar months desired at the same rate per month as the Monthly Commutation fare. For example, Monthly Commutation fare between New York and White Plains is $8.91. If ticket for two months is desired, the fare will be $17.82; for three months $26.73; for four months $35.64, etc.

It will be necessary for Commuters to provide new photographs to be used in connection with new form of ticket and holder. These photographs will be furnished without charge provided the facilities of E. L. Jenkins & Company, Photographers, are used, and for the convenience of our patrons these facilities will be available at Grand Central Terminal and Weehawken Station. Commuters who prefer to have photographs made by other photographers are, of course, privileged to do so at their own expense, but such photographs must conform to the following specifications and be delivered to ticket agent in time to have ticket and holder prepared when required."

Particulars are also given of new "50 Trip Family Tickets" and Suburban Excursion Tickets.

## The Vascongados Railway, Spain.

THE North of Spain is a country of sharp mountain ridges, dropping down to the sea very suddenly, and one that cannot be served easily by a railway, especially a broad (5 ft. 6 in.) gauge one. It also abounds in mineral wealth, especially around Bilbao, and so some means of transport had to be thought out, and they decided on a line of metre gauge. The Vascongados line at present is formed out of the amalgamation of three companies:—(1) Elgoibar-San Sebastian, (2) Malzaga-Zumarraga, (3) Bilbao-Durango. The necessary connecting lines have been made, and the line now consists of one main line from San Sebastian to Bilbao, with two branches, one from Malzaga to Zumarraga, and one from Durango to Elorrio. The line is single throughout, with passing places at the principal stations (*i.e.*, those that are not "apeaderos" (halt). It is built throughout with severe grades and numerous engineering works, including several tunnels of varying lengths and passing through some most delightful scenery. Leaving San Sebastian (Amara station), a station with only one main platform and one short bay, it practically immediately dives into a tunnel, and, after winding among the mountains, Lasarte Empalme is reached, where a metre-gauge line to Pamplona diverges. Then the line soon passes Chapparanea and runs along the beautiful banks of Aya-Orio, two small towns at the mouth of the river. Then the railway passes inland, and touches the sea at Zarauz and again at Zumaga Empalme. Here the Urola electric railway comes in from Zumaga Puerto, and, running side by side, the two proceed to Arrona, where the Urola goes inland to Zumarraga. The Vascongados proceeds towards the coast, and high up on a ledge wends its way through tunnels until Deva is reached. Of the stations passed, Deva and Zumaga rank as the biggest, and Deva is slightly the larger, having an extensive goods yard. The line here leaves the coast and proceeds up a river to Elgoibar, a large manufacturing town. Then the scenery becomes wilder, and Malzaga, an important junction, is reached. This is a junction for Vergara and the famous Vittoria and Zumarraga on the main line, Madrid-Irun. There is a restaurant at this station, and it is the place where large Spanish sandwiches of fish and omelettes are procured, as the "expresso" stops there at a convenient hour. The next station is Eibar, a large town manufacturing pottery. After this the train leaves the province of Guipuzcoa and enters that of Viscaya. Soon Durango is reached. It may be called the terminus of the suburban traffic from Bilbao, if the line can be said to boast any such service. It is a large station, and possesses the locomotive shops of the line. Then Amorebeita is reached, and, after a very ugly journey, Bilbao itself. The terminus (Achuvi station) is not a very large one, as it consists of one single platform. The engines are of various types, but the ones generally in use on the main line are 2-6-0's of two classes. Both were built in Germany, the older ones provided with smaller driving wheels and longer funnels. The later ones have large driving wheels and shorter funnels. Both are fitted with very small tenders run on four-wheel bogies, which

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makes them look like 2-6-4T's. There are also some tank engines, mostly used on branch and goods work, of the 2-6-0T and 2-6-2T types. These were also built in Germany, and to add to these are some 4-4-0T and 2-6-0T engines, built in England. These are very smart and fine-looking engines, with brass-topped funnels, and very much like those actually in service in England. The carriage stock is not kept very well, but is almost all bogie-stock (except branch-line stock), and built in England. In fact, a contract has been secured this year for carriages by the Leeds Forge Co., Ltd. There are three classes in service, but the "expressos" only convey first and third. The whole stock is fitted with link couplings, and also centre-buffer A.B.C.-type couplers are fitted to some stock. The signalling is irregular, but it may be noted that green is used as safety, compared with white in use on the Norte. The line is in course of electrification, and the service at present is very good for Spain.—["MIDI."]

### Yesterday and To-day in U.S.A.

I AM enclosing herewith the illustrated section of *The Detroit News* dated January 13. On page 3 of this you will find a few cuts which possibly may interest you, showing one or two fairly historic locomotives in the U.S.—[G. W. HARVEY.]

The views in the main are explained by the inscriptions as follows: (1) "Newton's idea. Huge copper boiler mounted on wheels with a fire box underneath, which would, by the operation of a lever, release enough steam to shoot out behind and press against the atmosphere hard enough to force the vehicle ahead. This idea originated in 1680, but was never put into concrete form." (2) "The iron horse before the days of the Civil War. This is an early type of locomotive, and was really the first step toward the present-day engine of gigantic proportions." (3) "Type of locomotive still in use in Portugal. The best it can do is less than twenty miles an hour. Some time ago an American tourist referred to it as the 'Twentieth Century Limited,' and the name stuck." (4) "One of the early types of locomotives. This was called 'The Atlantic' and was built in 1832 by Phineas Davis for the Baltimore & Ohio Railroad. After that the development in steam power was quite rapid and changes were being made almost every month or so." (5) "A great event in the history of American railroading. Linking the first trans-continental railroad in Utah in 1869. This photograph was taken on the occasion of the driving of the golden spike to commemorate the completion of the first line of steel rails connecting the Atlantic and the Pacific coasts." There is also a view thus described: "A pictorial history of railroading. Here are the locomotives of yesterday and to-day standing side by side, both with steam up and ready to go. The monster is the one pulling the Twentieth Century Limited on its race from New York to Chicago. The little funny contraption is the DeWitt Clinton, the first New York Central train. In the early days the DeWitt Clinton aroused as much indignation as it did enthusiasm among the people of the countryside." The page is completed by four other views: (A) "Oiling the biggest locomotive. William Alexander, the engineer, leaves the cab to fill the oil cups when a stop of five minutes or more is made. Mr. Alexander is shown here carefully nursing a locomotive with 24 drive wheels and weighing 415 tons." (B) "This is the characteristic pose of the engineer. The safety of the passengers and the train depends on him. He must have a clear eye, calm nerves and a steady and powerful arm. If there is an accident—but there must not be an accident." (C) "The railroad fireman. His duty is to watch the gauge and keep up the proper amount of steam at all times. He must learn to keep his fires burning evenly. He works under the engineer's orders, but he must be able at any moment to step into the pilot's seat and take charge in an emergency." (D) "World's largest locomotive. It is 125 feet long, three times the length of the standard freight car. It rides the rails on 34 wheels, including 12 on the tender, is 16 feet 4 inches high and weighs 1,116,000 pounds." The whole series is artistically printed in a photographic brown tint.

### Railway Travel in Canada.

IN the December number a writer referred to the lack of privacy in the sleeping compartments. "I have been to Vancouver three times by the C.N.R., but I didn't trouble to have a bed at any time. However, on the Toronto and Montreal service, and others, there are private sleeping berths; also an invention that is now being tested to eliminate in a large measure accidents on the line."—[WM. HUGHES.]

### A Light Railway in Brittany.

THE view on the next page shows a 0-6-0T No. 25 of the "Chemins de Fer Economiques des Côtes du Nord," a light railway system which serves a large area between Dinard and Plancoet. The engines employed are all 0-6-0T's of varying sizes; they are painted a dark green with the

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exception of one type which affects a red colour similar to the L.M.S. The locomotive illustrated was built at Lille in 1918 and is interesting as being generally representative of French tank engines. The central buffer, headlamps and lifting jack on the engine are unusual except on these light railways. Rolling stock consists of eight-wheel bogie coaches, with first and third-class accommodation, the first-class portion being painted dark green and the second-class maroon. For goods traffic some large bogie open wagons, and four wheel vans were in use and were painted light grey. Station buildings were light in construction and the track used was Vignole section, spiked down to rough wooden sleepers, thus the speeds attained were not very high. Warning of the approach of a train was given by means of a syren-like whistle, more like the hooter of a cross-Channel steamer !

["CLAUD 8810."]

## Canadian Locomotives and Trains.

REGARDING the photo published on page 477 of the December issue showing what is supposed to be a C.P.R. engine, this, as the tender plainly shows, is a C.N.R. engine, of which class there are many, and up to the introduction of the "6000" class they hauled the heaviest of the trains. With the advent of the "6000" and later "6100" classes of 4-8-2 and 4-8-4 types, their work is confined more to secondary or more medium weighted trains, although the Inter-City Limited between Toronto and Ottawa is still hauled by them, but when they load up to 12 cars they have to be pushed rather hard. They are, however, a very fine and successful type of engine.

While everything points to a desire to get down to black for engine colours in the old land, just the opposite tendency is now being shown in Canada. I am sure that the appearance of these engines wil be greatly enhanced as they are very fine-looking machines to look at even in black.

Reference is also made to a run of approximately 600 miles and is done in a little over 13 hours, which "compares very favourably with the 'Flying Scotsman,' which doesn't fly." Coal is taken from coal hoists erected over the main line tracks twice on the trip, and water is taken at the end of each division.

[W. OGILVIE.]

The newspaper cutting sent by Mr. Ogilvie reads as follows :—

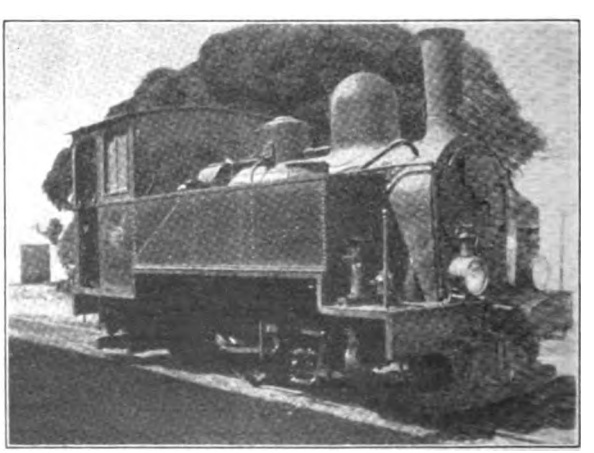
Emerald green, flamered and black will be the new colours of the big passenger locomotives of the Canadian National Railways. Resplendent in its new garb, engine No. 6138, the first of the locomotives to be repainted, steamed out of Bonadventure station to-day on its speedy run with the International Limited from Montreal to Chicago as far as Sarnia, the longest single-unit engine run in Canada. No. 6138 acted as the mechanical herald for the new colours of the Canadian National passenger engines, and its appearance attracted general attention.

No. 6139 has emerald green for its predominating colour. This was applied to the boiler and tender tank, as well as to the wheels and tyres. Black is the colour of the cab, the smoke box, coal hopper and the feed-water heater. The buffer beams in front and rear of the locomotive are painted a brilliant flame red, and this colour is also used in the spokes of the wheels and the fluting of the drive rods.

## Old Netherland Locomotive.

I ENCLOSE a photograph (page 394) which I took last March in the Central Station, Amsterdam. It represents what is probably the oldest type of main-line passenger locomotive still in use on the Netherland Railways. The engine in question, No. 929, is one of a batch of 50, built in 1874 by Beyer Peacock & Co. to the specifications of the Dutch State Railways. Although nearly sixty years old, there is still a considerable number of them scattered about the country, though they are chiefly relegated to the light duties of passenger-train shunting.

Although originally built to the requirements of the "Staatspoorwegen" engineers, they present various features which are decidedly "Beyer Peacock" in appearance. These, however, do not include the square sandbox and the bell which adorn the



0-6-0T AT ST. CAST.
Chemin de fer des Côtes du Nord.

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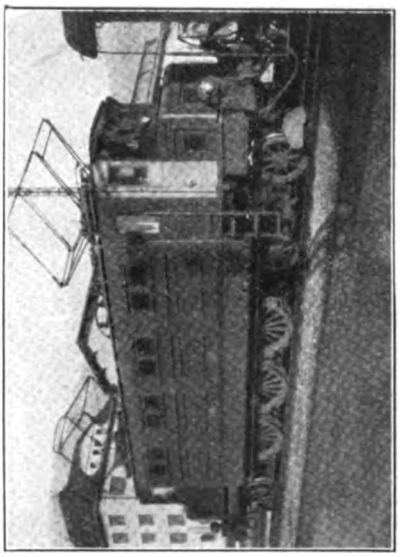
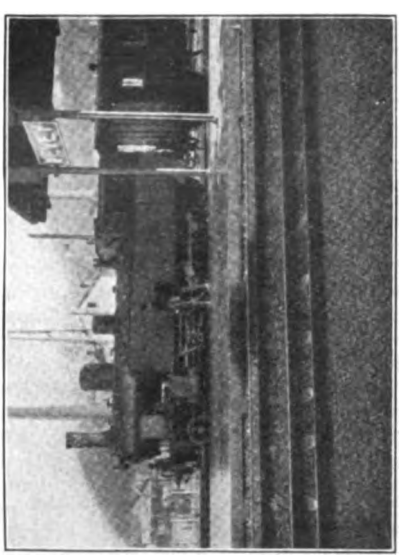


ELECTRIC LOCOMOTIVE No. 10650 [*Evenlodt.*

ELECTRIC GOODS TRAIN.



SWISS FEDERAL 2-6-0T No. 6515. [*Photos.*

boiler-barrel fore and aft of the polished-brass dome cover.

It is interesting to notice how these engines in spite of their age are "outliving" the later German-built machines of the former Holland Railway, of which No. 1007 *Kalypso*, illustrated in the December, 1928, number of the RAILWAY MAGAZINE, is an example.

The last-mentioned class are not nearly so pleasing in external appearance as the Beyer Peacock engines; whatever grace their outline might have possessed is entirely spoiled by the presence of a tall "stovepipe" chimney, a dome cover resembling a cast-iron lighthouse-top, and a shapeless and preposterous cab, which is built of wood!

[C. HAMILTON ELLIS.]

### Railways in Western Switzerland.

REFERRING to the photographs, one is of the only steam locomotive that I ever saw at Vevey—Swiss Federal 2-6-0 tank No. 6515, with outside cylinders and Walschaert's valve gear. This engine, with three six-wheelers, worked the line up to Chenbres, which is heavily graded. Another photograph is of an electric 2-6-4 or 4-6-2 express engine—No. 10650—of the type which, together with 2-6-2's, work the main line. The remaining photograph is of a westbound goods train approaching Chateau D'Oea, Vaud, on the metre-gauge Montreux-Oberland-Bernois section. The train is hauled by an electric motor passenger coach. These are painted a light bluish mauve, with white upper panels, which is very pleasing. The average speed on this line (which rises 2,000 ft. in the first 20 miles from Montreux) is 25–30 m.p.h., excluding stops, if I remember rightly.—["EVENLODT."]

### Colours of Foreign Locomotives and Rolling-Stock.

WHILE we have been very pleased to publish previous contributions under this heading, and in the aggregate a substantial amount of information has been thus collected, it is rather to be regretted that in many respects there should be so much disagreement. Some of this is, no doubt, explained by the fact that so many foreign locomotives are not kept in anything like the same condition as is usually the case here, even in these days when, it is alleged, cleaning and new paint are governed more or less by economy considerations. Hence, it is easy to understand that many foreign engines officially painted green or some other colour have been described as black, and so on in other cases. No doubt, too, some of our readers have made statements on the basis of recollections which have not always

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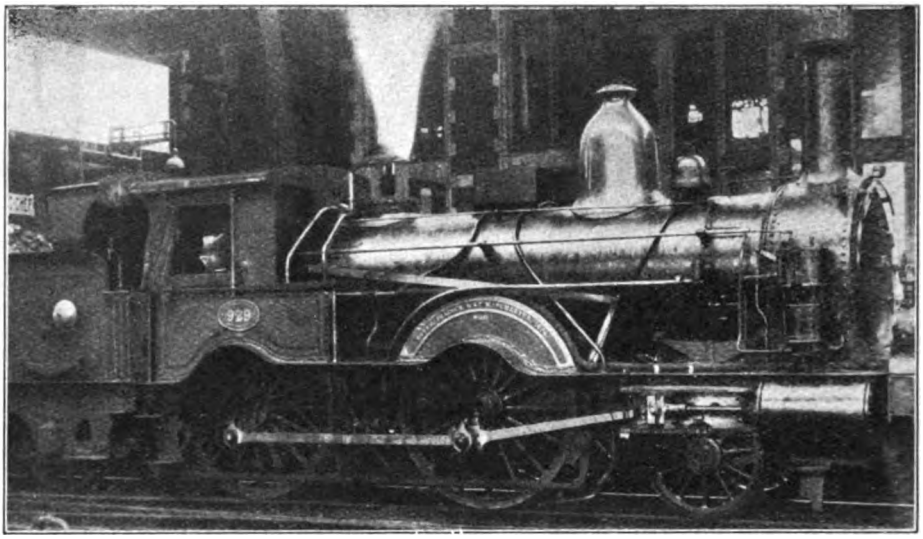

*Photo.*] DUTCH 2-4-0 LOCOMOTIVE BUILT IN 1874. [*C. Hamilton Ellis.*

proved reliable. However, as the study has been one of considerable interest, notwithstanding the occasional discrepancies, the subject can be legitimately closed for the time being, with a series of notes, including some comments on foreign locomotive matters generally, sent by a correspondent, and by a further set of notes from another reader which also require attention before concluding.

The first contribution in question is as follows :—

NORD.—In the colours given for locomotives, black and yellow lining is given first. There is a definite scheme. To the best of my knowledge the main-line express engines are painted chocolate with yellow lines. This was, I believe first adopted when the first 4-4-0 de Glehn compounds were built, and the class were called "Chocolates." This type was followed by a larger class of 4-4-0 compound usually referred to as the "Large Chocolates."

Dark green with thin red line is used, I believe, for engines used for work of lesser importance. The $\frac{4\text{-}4\text{-}4}{T}$ and $\frac{4\text{-}4\text{-}4}{T}$, as well as sundry 0-6-0, are painted this colour, and I believe a few of the ex-Prussian 4-4-0P8.

P.L.M.—The official colour is I believe, green, and if the engines are black it is probably due to neglect.

ETAT.—The official colour is, I fancy, black. I have never yet seen one painted green.

MIDI.—This company, to the best of my knowledge, *has no green engines*. All are painted black, and some have the boiler bands of brass brightly polished. I have seen a good deal of the Midi line, having visited most of their chief locomotive depôts, viz., Bordeaux, Toulouse, Narbonne, Tarbes, &c. The electric passenger stock on the Villefranche-Vernet to Latour en Carol is painted pale yellow. This line is metre gauge.

ORLÉANS.—The engines are all painted black, though I am inclined to think they leave the paint shop in a grey colour with the boiler bands painted black. I have seen engines at the works at Tours thus painted. During the Paris Exhibition of 1925 there was a scale model of a 4-6-2 compound made by pupils at Tours Works. This engine was painted as described above.

At the present time, all trains from Paris are worked by electric locomotives, painted green. Many have the name of their depôt fixed on the sides, in letters of brass. Trains for the Tours direction and also for Bourges are worked forward from Les Aubraés (Orleans) by steam locomotives, but those bound for the Limoges direction continue their journey to Vierzon hauled by the electric locomotives. Engines are changed at Vierzon and Brive, 4-6-2 "Pacifics" being provided to haul the expresses. For Bordeaux, engines are usually changed at Tours, St. Pierre des Corps and Angoulême. There are four classes of "Pacific" : three are four-cylinder compounds and the other a two-cylinder simple. This latter type were built in America. Prior to the introduction

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of the American-built 4-6-2 type, the Orleans Company had two classes of four-cylinder compound, 4-6-2, but they were almost identical, the chief difference being in the size of the driving wheels. After the advent of the simple type 4-6-2, a number of the standard type of 4-6-2 were procured by the P.O. Company. These engines are identical with those working on the Etat and Est Railways. The engines have their shed allocation stencilled in white on the cab sides.

Freight trains are usually worked by 2-8-2 two-cylinder simples or 4-10-0's. These latter engines are mostly to be found on the Vierzon to Montanban line where the gradients are severe. Passenger trains on the secondary lines are usually hauled by 4-6-0's, and the freight trains by 2-8-0 compounds. Several of the 4-6-0's have two outside cylinders and are simple, many having been built by the North British Locomotive Company at Glasgow.

The goods stock of the P.O. is generally painted red, though some of the open wagons are grey.

ITALY.—The engines are black. They used to have vermilion buffer beams, and the coupling rods were of the same colour, but it is some years since I was there so I do not know whether this still obtains. Express engines all carry the Fascist emblem on the smoke-box door.

The carriages are painted green, and the freight stock used to be red, the same as those belonging to the P.O. Company of France.

The Italian express trains are chiefly worked by 2-6-2 and 2-8-2 engines, all of which are superheated. There are a few 4-6-2's, these working on the Rome to Florence and Milan to Venice sections. There appear to be two classes of 4-6-2, the later class having a wider fire-box, and the trailing wheel fitted with outside bearings, &c. There is a possibility of an enlarged type of 4-6-2 having three cylinders, but this is not certain. Most of the express engines are built by the well-known firm, Ernesto Breda, of Milan. This firm has supplied a few engines to the Egyptian Government Railways.

Trains of lesser importance in Italy are usually hauled by 2-6-0 superheaters, with inside cylinders but outside valves and gear.

The further communication, sent by "Midi," includes the following items :—

SPAIN.—"Norte" engines black; coaches varnished teak; old coaches green. "Vascongados" engines black, green and brown; 1-2-3 bogie coaches varnished teak; old third-class coaches green or brown. "Urola" (electric) motor coaches varnished teak; trailer coaches blue. "Bilbao-Portugalete" engines black picked out in red; coaches varnished teak.

FRANCE.—P.-O. electric locomotives green; motor and trailer coaches green; steam engines black; coaches green. "Midi" electric 4-6-4 locomotives blue, and 0-4-4-0's green; motor coaches green; steam locomotives black picked out with yellow; coaches green.

BELGIUM.—"Nord-Belge" main-line engines brown; tank engines greenish black.

DENMARK.—"Statsbaner" engines black with red-white-red band on funnel; coaches red. "Gribskov" line the same.

### Another French Tramway.

IN forwarding some photographs (not reproduced), Mr. C. G. Lakin-Smith sends the following remarks in regard to the Berck-Plage and Rang-du-Fliers Tramway: "Rang-du-Fliers, though only a small village, is quite an important junction, being on the main Calais-Boulogne-Paris line of the C. de F. du Nord, and the tramway conveys a large number of passengers, and no small amount of merchandise, every year between this station and Berck-Plage, a seaside health resort with a population of about twenty thousand. The line, which is built to the metre gauge, is four and a half miles long, and is single throughout, a passing place for trains being provided, though not used, at Berck-Ville, an intermediate station. Trains are made up usually of one bogie passenger coach, a four-wheeled brake van, and an open goods truck, and are scheduled to do the four and a half miles in twenty-two minutes, including two intermediate stops. It is interesting to note that there is only one signal (which is at Rang-du-Fliers) on the line, and that is painted a bright purple colour. The single-buffer system is in use on the locomotives and rolling stock, a practice which is common on many of the light railways and tramways in France."

### Locomotives in Kenya and Uganda.

ON page 310 of the October issue of THE RAILWAY MAGAZINE, Mr. A. S. C. Hill, of Kampala, referring to trains in Kenya and Uganda, mentions locomotives of the Garratt type, with a wheel formation of 2-6-0+0-6-2. The only Garratts which have been built in England for the K.U.R. are of the 4-8-2+2-8-4 type, of which four were built in 1926, twelve more, almost identical (1,000 gallons more water and new type tanks and coal bunker), early in 1928, and eight more, identical with the last twelve,

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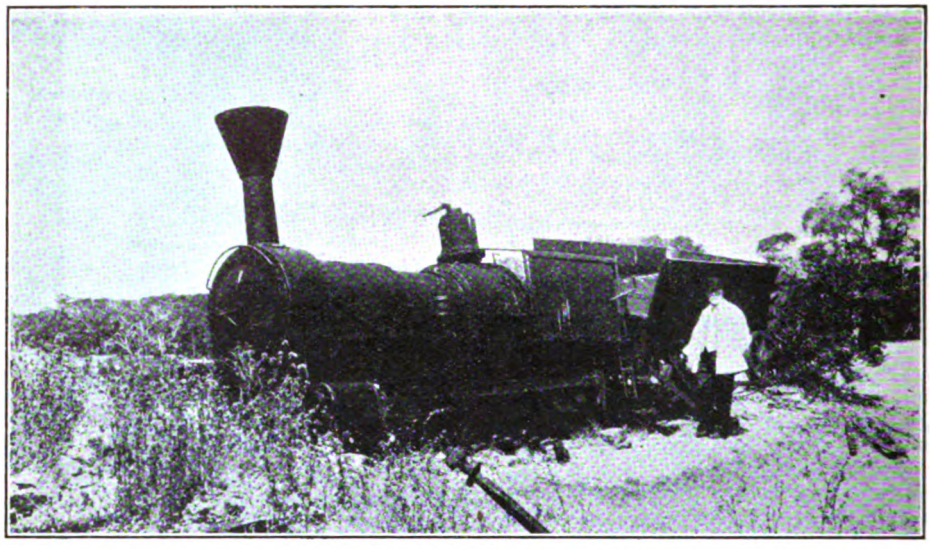

*Photo.*] [*H. Wheelwright.*

THE FIRST LOCOMOTIVE IN WESTERN AUSTRALIA.

which were shipped a couple of months ago. Can Mr. Hill supply any more information as to the 2-6-0+0-6-2 type? Perhaps these have been rebuilt from ordinary engines, though this is hardly probable.—[D. R. CARLING.]

**The First Locomotive in Western Australia.**

I AM sending you a photograph of Western Australia's first locomotive. It was built at Ballarat by Hunt & Company in 1871, and was either the first or second locomotive built in Victoria. When first turned out it was a tank engine, the tender being added later. It was the property of the Lockville Timber Company and ran from Lockville saw-mill to Yoganup, 12 miles. On numerous occasions I have driven the old relic in 1884 and 1885, and still retain a friendly feeling for the "old girl." I am standing by the engine in the photograph.—[H. WHEELWRIGHT.]

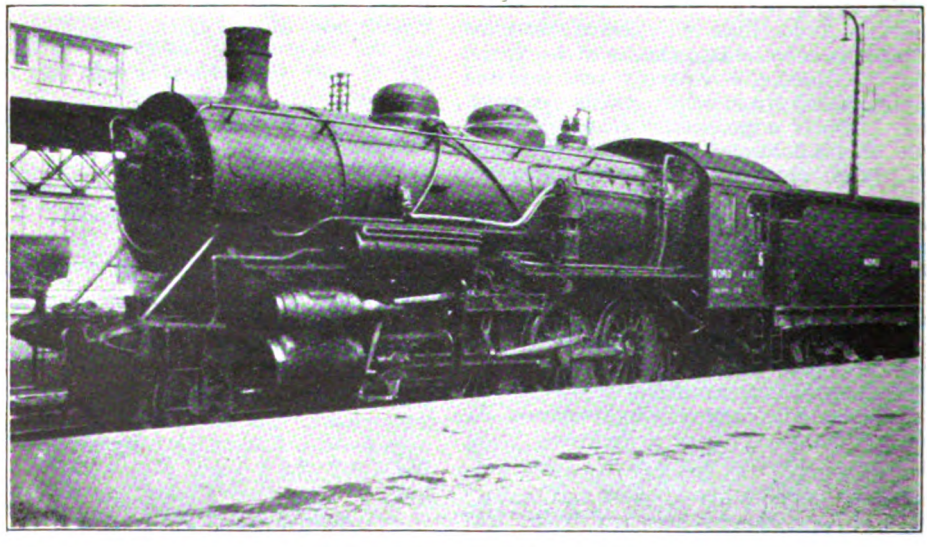

*Photo.*] AN AMERICAN 2-8-0 IN FRANCE. [*J. Quanjer.*

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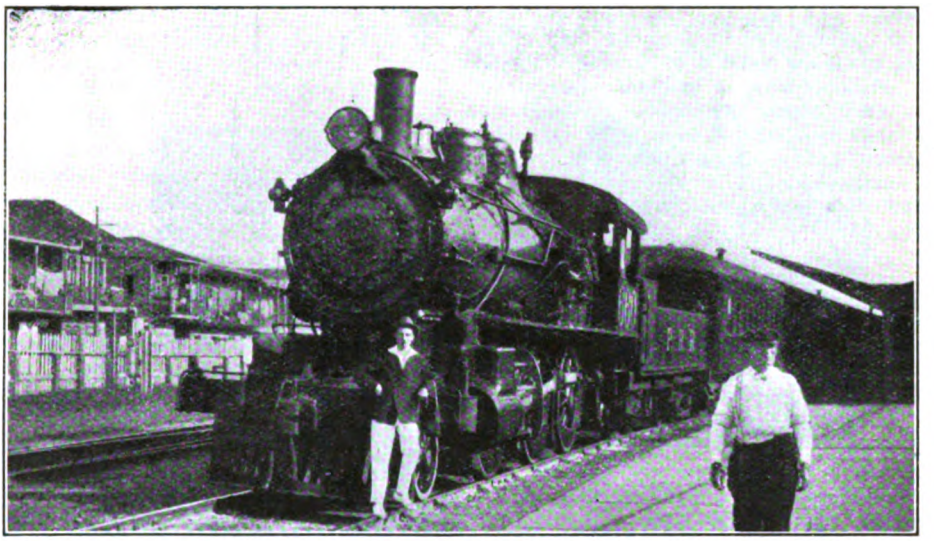

*Photo.*] 4.35 P.M. COLON TRAIN, PANAMA RAILROAD. [*C. J. Housego.*

**American Locomotives in France.**

On page 480 of the December number, Mr. Nevile Reid asked for the history of an American goods engine he had noted on the Bordeaux-Medoc line. Presumably this is one of the 1,299 "Consolidation" (2-8-0 type) engines, intended for the American army in France. They were built in a hurry during 1917, with bar-frames, iron firebox and stays, according to American practice, 1,149 by the Baldwin Locomotive Works and the remaining 150 by the American Locomotive Company, and were extensively used during the last year of the war. After the war they were transferred to the French railway companies. I photographed one of the Consolidation engines, Nord No. 4.1601, at Paris, where it was working empty carriages into the Gare du Nord. It was built at the Baldwin Works, and still retained the black war number plate (No. 1424)

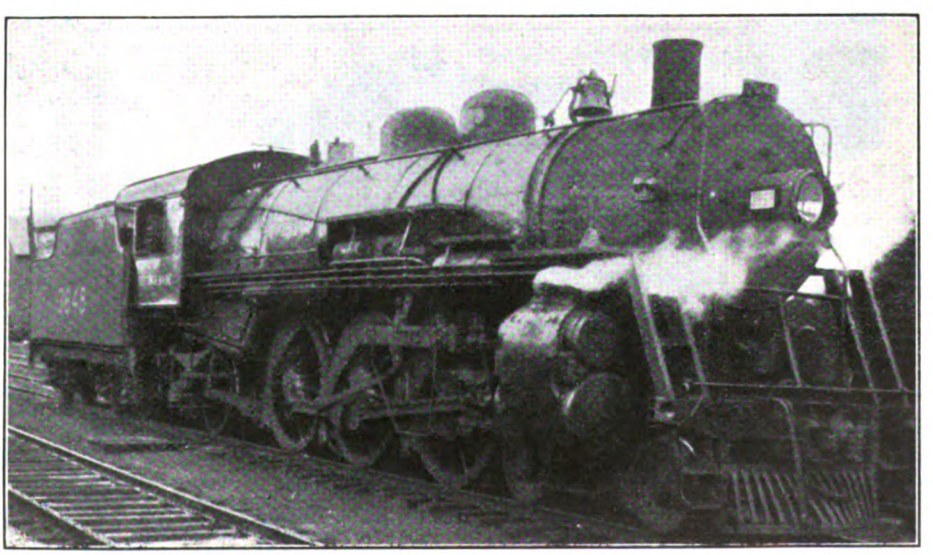

*Photo.*] 4-6-2 No. 3648, BOSTON AND MAINE RAILROAD, U.S.A. [*A. Curran*

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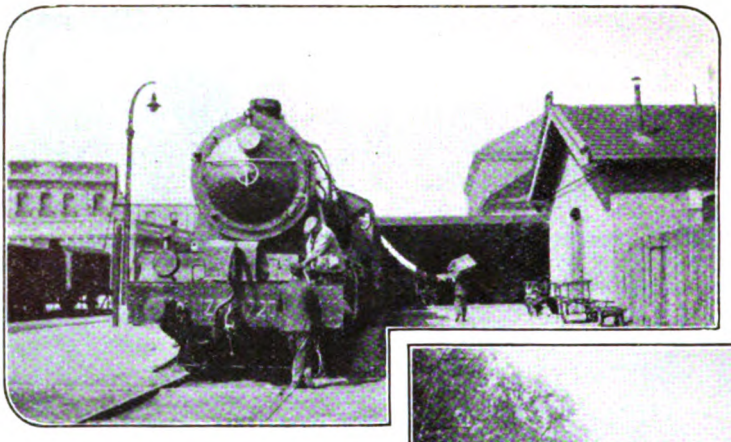

## SCENES ON SPANISH RAILWAYS

1. ALCAZAR, SAN JUAN STATION, M.Z.A. 4-8-0 No. 1720.

2. ALGECIRAS TOWN STATION. ANDALUCES 4-4-0 ON "MIXTE" TRAIN.

3. VILCHES (JAEN), M-Z-A 4-8-0 ON SEVILLE EXPRESS.

4. ALCAZAR, SAN JUAN STATION.

*Photos. by Rev. H. D. E. Rokeby.*

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under the railway company's number. The "6" above the company's number is the number of the shunting service. Under "Nord" on the cab you will find the word "Consolidation."—[J. QUANJER.]

### American Locomotives.

IN view of disparaging references to the Boston-Portland service of the Boston and Maine Railroad, I send a photograph (reproduced of No. 3648, a 4-6-2 of Class P-2-A. (See page 397.)—[A. CURRAN.]

Mr. Curran also sends an advertisement of the "Flying Yankee," which includes the following remarks:—"Leaving New North station at 9.25 every week-day morning, this non-stop B. & M. flyer—the fastest train in New England—takes you to Portland in just 2 hours and 20 minutes; a quick, comfortable trip over smooth roadbed—in Portland before you know it. Returning, leaves Portland at 5.50, reaching Boston at 8.10 p.m. The 'Pine Tree Limited' leaves for Portland at 4.30 p.m. week-days, a 2 and a half hour run."

### Railway Travel in Spain.

APROPOS of your article "Across Spain in a Railway Train," by Mr. Tollington, I send some photographs and notes of a similar journey I made, but in the reverse direction. I travelled straight through from Kettering to Cordova, leaving at 4.23 on a Sunday afternoon and arriving at Cordova at 6.43 p.m. on Tuesday. I travelled via Newhaven—Dieppe, and left Paris by the *train de luxe* (Sud Express). I had only 35 minutes to cross Madrid and catch my connection, so I asked the sleeping car conductor at Irun if the train had been running punctually. He replied that it would certainly run punctually that night, as General Primo de Rivera was going to travel by it. His special saloon was next the engine, and he himself got in at San Sebastian. I woke up next morning at Airla, one of the most perfect examples of a walled town in Europe, being much larger than the "Cité" of Carcassonne. We were then 20 minutes late, but by the time we reached Villalba, the junction for Segovia, we had regained our arrears. The Airla route passes through even finer scenery than the Segovia line, over which Mr. Tollington travelled. A punctual or even an early arrival at Madrid seemed probable, but we were held up for 10 minutes just outside Madrid (I assume for permanent way repairs). However, I was able to catch my connection comfortably at the Atocha station at Madrid. We ran non-stop from there to Alcazar de San Juan, the junction for Alicante and Valencia. After that we stopped frequently. At the roadside station of Vilches we spent about 20 minutes waiting to pass another train on the line, which was single track after Alcazar. This gave me another chance to photograph the train, which was hauled by a 4-8-0 locomotive. At Vadollano the engine which had brought us from Madrid went off, and its place was taken by a similar one, which I was informed would work through to Seville. At Baeza we dropped one coach for Granada. We waited our full quarter of an hour at one of the most dreary stations it has ever been my misfortune to see, although we were now nearly an hour behind schedule and the shunting operations were soon over. At Las Madrigueras, about nine miles farther on, we saw the wreckage of the express trains between Madrid and Algeciras which had run into each other a few days previously. It was a very wild spot, miles from any road or village, and I was informed that it was five hours before any assistance came to the sufferers after the accident. The two locomotives (4-8-0's, like the ones which were hauling our train) were still in a firm embrace, and we had to go past along a temporary line. A lot of wreckage had fallen down the embankment. At Espelivy, another woebegone station, we left a further coach for Jaen and Malaga. We eventually arrived at Cordova an hour late. It was not an exciting journey and the scenery was never inspiring, except for a few miles through the Sierra Morena.—[H. D. E. ROKEBY.]

### French Railway Signals.

FOR sectional work, semaphores mounted on tall steel posts are employed on the Nord Railway. These show a white light for clear and a red and green for danger. Both arms are mounted on the same post, that is, up and down. One lamp serves the four lights, a system of reflectors being utilised. When a train passes, the signal man (or woman) places the arm at danger, and this automatically lifts a small arm near the base of the next section signal post. This announces an oncoming train. He also lowers the corresponding small arm, which automatically lowers the previous section main signal. Thus, entrance to a section is controlled from its ends and not its beginning. The distant is a green arm of corrugated iron with slits of green glass in it, so that at night the shape of the arm is outlined in green. At the off position a white light is shown. These signals are automatically set at danger by

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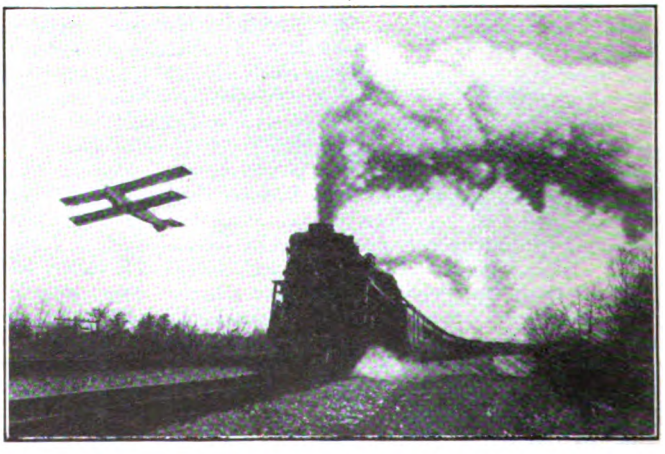
BLUE COMET TRAIN DE LUXE, NEW YORK-ATLANTIC CITY SERVICES, NEW YORK CENTRAL RAILROAD. [*Topical.*

a ramp between the rails, which sets in motion a ponderous mass of wires, weights and levers, causing the post to sway. The levers and control handles are in the open, the only shelter of the signalman being a hut like an English fogman's hut. When shunting operations are to be performed, a square tin banner of red and white is fixed with a spike in the sleeper, and a special outer distant, consisting of a red disc showing red light for caution and white for clear, is put to danger. The only interlocking consists of chains and padlocks in the sacred keeping of an official termed "Aiguilleur," who is distinguished by a small red flag and brass horn. He superintends all shunting operations and keeps a watchful eye on the signal man (or woman), particularly if it is the latter who is on duty. These arrangements, however, apply only to small stations and sections equipped with trailing points only. The latter are worked by a small lever by the side of the track, similar to Hornby and toy railways. Speed restriction boards, buffers, etc., are all illuminated at night, and the lights are hauled into position by a chain passing over a pulley. Incidentally, when a red banner is erected for shunting purposes, the home signal is left off; otherwise a train would be falsely announced at the next post by the small arm.—[W. R. LAWRENCE.]

**The "Blue Comet."**

THIS is the name given to a "New Coach De Luxe" express instituted by the Jersey Central Railway between New York and Atlantic City. It is further described as "—at last—a colorful train for a colorful resort!" with the following details, to quote one of the advertisements of which a copy is sent with this letter:—

"A creation of ultramarine blue and Jersey cream from nickel finished engine to observation car—all specially designed de luxe coach equipment—plush and all-over carpet of Persian blue and gold, conventionalised comet design — Circassian walnut and nickel finish. Unique individual seat coaches, with ladies' lounge and every convenience—Observation Car—with 50 silver blue wicker chairs—Smoking Car with blue leather individual seats, blue and white diamond tiling floor. The Dining Car in blue even to napery and china. Meals at moderate cost—an appetising blue platter luncheon at 75 cents. Running time—3 hours flat! The fastest and finest daily trains to Atlantic City!" The train was on inspection at the Jersey City Terminal on February 14, and started service on February 21. It's a fine train—but the speed is nothing out-of-the-way, as it is only about 135 miles to Atlantic City on the J.C.R.R. The actual running time is 2 hr. 45 min. —[ERIC CRICKMAY.]



THE "INTERNATIONAL LIMITED" EXPRESS, C.N.R. AND A PASSENGER AEROPLANE NEAR TORONTO.

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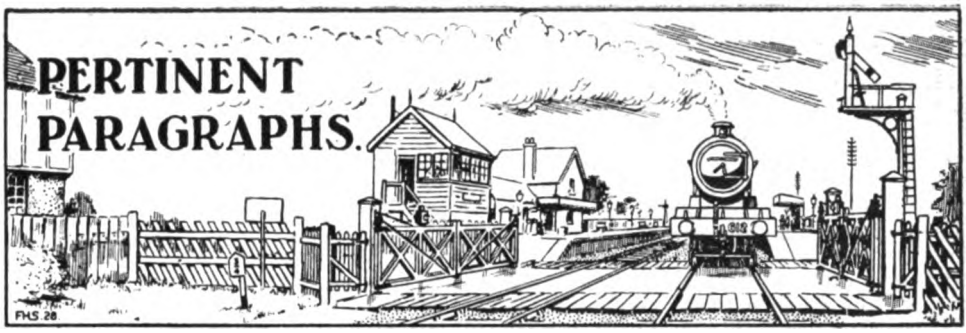


### Garston Dock Improvements, L.M.S.R.

We are advised by the L.M.S. Railway that a large part of the £200,000 scheme for improving facilities at Garston Docks has already been completed. Work is proceeding rapidly, and the remainder of the scheme will be completed in time for the 1929 timber season. The improvements include:—

Additional timber storage area of about 35 acres, with additional siding accommodation for 1,155 wagons. Other accommodation is being provided for 170 additional wagons.

A new commodious shed for fine wood goods is in course of erection, and is expected to be ready for use at the end of April.

Additional and improved siding accommodation at Park Sidings North Dock, Stalbridge Dock and High Level.

Cranage facilities modernised and increased, including four 7-ton electric luffing grab cranes. Seven coal tips reconstructed to take 20-ton loads.

The first of the new electric cranes has been installed, and all four are anticipated to be ready for use by the end of April. Despite the fact that the total timber traffic handled at Garston in 1928 was equal to that of 1927 (a peak year), no congestion occurred. The improvement scheme at present in hand is adequate to deal with any business they may be offered with ample margin for future expansion.

### Compulsory Accident Insurance in Spain.

Although Spain is not usually regarded as ranking among the leading nations in the matter of railway progress, it has occasionally produced surprises. We may quote as examples the consortium formed by the Government with the railways in 1924 and, later, the Eight-Hour Day Law which distinguished between "active" duty and "waiting" or "passive" duty, the latter only counting for half the value of the former in assessing overtime. Now we have on the Spanish railways the compulsory insurance of all travellers against risks to life and of bodily injury, the regulations for which our Madrid correspondent reports are in force and working normally. We do not know of any other country in which the passenger, by the mere act of taking a ticket for his journey, is automatically insured, by the addition of a small sum to the fare, against the risks of death or bodily injury. We understand also that the procedure is relatively simple, and that, moreover, it in no way affects the legal responsibility of the railway company or prejudices the right of the injured person. We have, of course, in this country the voluntary system of insurance, under which the passenger may take out a special policy in the form of a ticket at the booking office, and there are also newspaper insurance coupons. It has, however, been left for Spain to recognise the necessity for insurance and to standardise it under the ægis of a State Department.

### The Level Crossing Danger.

Fortunately, railway level-crossing accidents are very rare in this country, most of those which occur being at places where unprotected and usually private or semi-private roads cross railway tracks. In other countries, and especially in the United States and Canada, the level-crossing danger is a very real one, and in their own interests, as well as out of consideration for motorists, the railways are continually devising measures to impress on motorists and others the need for carefulness at the many places where roads cross railways without the protection to which we are accustomed. With this object in view, the "movies" have been enlisted by the Canadian National Railways in a great campaign for the elimination of railway accidents. As is pointed out, one of the most frequent causes of railway disasters in Canada is the practice of thoughtless motorists of "baiting the engineer," a "game" which consists in "trying to beat an oncoming express to a level crossing."



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As a general rule, the motorist wins this race with death by a narrow margin, but in 1927 the " game " resulted in 258 accidents, with a death-roll of 75. To induce motorists to give up this dangerous practice, the railway company, in co-operation with the Ontario Government and a moving picture service, has produced a film in which the " game " is shown in all its thrilling detail. To " shoot " the film, one movie operator was stationed on the " cow-catcher " of a fast express, another at the level crossing, and a third in an automobile, whose driver played the part of the careless motorist. The odds against the motorist were brought out by sub-titles as " This train weighs 1,500 tons; your car probably a ton. What chance have you? " and " The train travels at 88 ft. a second. Why try to beat it? "

## Express Train Loading.

MR. F. A. HILLIER sends the following notes:—

" Consequent upon the introduction of third-class sleeping cars and the provision of the latest type of vehicles, there has been a substantial increase in the tare tonnage of the principal East Coast Anglo-Scottish night expresses. The standard formation of the 7.30 p.m. down ' Aberdonian ' express out of King's Cross seems now to be 15 of the heaviest vehicles, including a 38-ton restaurant car (detached at York), three 37-ton 1st class sleeping cars (one each for Inverness, Aberdeen and Fort William), and two 34½-ton 3rd-class sleepers (one each for Inverness and Aberdeen). The remainder of the formation is composed of the heaviest Scotch stock, and always includes five luggage brake vans, frequently of the new all-steel pattern, taring 31 tons each. The tare weight of this 15-coach formation is slightly in excess of 500 tons, and represents a gross load of approximately 530-35 tons. On three recent occasions, however, I have observed this express made up to 16 vehicles, weighing no less than 540 tons tare (the additional vehicle being, in each case, a 37-ton 1st-class sleeper) and about 575 tons gross. On each occasion one of Mr. Gresley's famous Pacifics was at the head of the train, working it unassisted.

" Another regularly heavily loaded train is the 4.0 p.m. down Yorkshire and Lincolnshire express, the usual daily load of which is 16 corridor bogies, including one 12-wheeled diner, and occasionally two, weighing 490-500 tons tare, and about 520-35 tons gross. The attachment of one or two coaches labelled ' Tyne Commission Quay ' to the 10 a.m. down ' Flying Scotsman ' on Saturdays generally brings that express over the 500-ton mark on that day, whilst the 1.15 p.m. down ' Midday Scotsman ' frequently conveys about 480 tons gross on Mondays. The fast scheduled 10.15 a.m. up Leeds express, due King's Cross 1.55 p.m., invariably loads to 14 bogies on Saturdays—460-70 tons full. The more lightly loaded up Newcastle express, due King's Cross 1.35 p.m., carries a considerably heavier load on Mondays, and has been noted on several recent occasions with 15 or 16 coaches on, including a Triplet articulated restaurant car set."

## Pennsylvania Railroad Improvements.

THE Pennsylvania Railroad Company has decided upon an extensive programme of improvements, including a main-line electrification scheme which, it is claimed, will be, when completed, greater in magnitude and importance than that of any other railway in the world in miles of track electrified, volume and density of passenger and freight traffic involved, equipment required, number of trains affected, and terminal operations entailed. The whole of the lines between New York and Philadelphia are to be progressively electrified. The new programme comprises 325 miles of line and 1,300 track miles, and is part of a plan which includes also the electrification of the lines between the Susquehanna, Schuylkill and Delaware River valleys, and the eastern terminals. The electrification involves an expenditure of 100 million dollars.

The plans are based on the estimated traffic in 1935, but they also have in view developments up to 1950, when it is anticipated that Greater New York will have a population of 30,000,000 people. It has been decided to adopt overhead construction, with A.C. at 11,000 volts, single phase, similar to that already in use on the Philadelphia suburban service. Power will be obtained from the Public Service Corporation of New Jersey and the Philadelphia Electric Company. The system is already electrified between Long Island City, N.Y., and Newark, N.J., and from Philadelphia to Wilmington, Delaware.

The electric locomotives will be of three types, one for high-speed passenger service, one for high-speed freight service, and one for shunting. Used singly, or in multiple, as required, they will provide any multiple of power that may be demanded. The multiple-unit cars for the suburban sections will be similar in type to those used between Philadelphia and Paoli, Pa. The number of trains to be operated with this equipment is 218 a day. The next sections

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to be electrified will probably be the low-grade freight line from Trenton, N.J., to Columbia, Pa., and the lines in and around Pittsburgh.

### Cheltenham Rail-Road Service, G.W.R.

ON October 29 last, the Great Western Railway introduced an experimental long-distance rail and road service between London and Cheltenham. The road portion of the journey operates between Oxford and Cheltenham, connecting at the former city with the trains to Paddington. Four daily and two Sunday services are provided each way, and the combined rail and road fares are 12s. single and 15s. return third class, as compared with 13s. 3d. single and 26s. 6d. return third class by rail throughout.

[*Topical.*

**PASSENGERS ALIGHTING FROM G.W.R. MOTOR OMNIBUS AT CHELTENHAM STATION.**

The service has proved more than a success, in spite of the fact that it was introduced in the winter. Originally, bookings were confined to Paddington, Cheltenham and Oxford, but on November 19 last these facilities were extended to and from Reading, and recently arrangements have been made to include bookings at the G.W.R. Bank Receiving Office, London, and also at 7 and 8, Charing Cross, London.

On Monday, March 18, the company introduced on the road portion of this service a number of the latest type of long-distance saloon cars. These vehicles are the finest of their type operating in the country. The chassis is the latest type six-cylinder Gilford, fitted with 20-22 seater luxury saloon body built by the Wycombe Motor Bodies Company. Below are given some of the outstanding features:—

1. Each seat is a separate armchair and upholstered in leather with moquette backs and sides.
2. Hot-water-heating apparatus adjustable to different degrees.
3. Cigarette, chocolate, and match machines.
4. Parcels racks for the whole length of the car.
5. Fibre mats on floor.
6. Loose cushions, draw curtains, ash trays, and rug rails.
7. Double roof with ceiling finished off with brown "Fabrikoid."
8. Clock and two mirrors.
9. Each window can be opened and is easily operated.

We gather that since its inception the service has proved as popular as could be expected, seeing that it was inaugurated only in the late autumn, and it may be anticipated that during the spring and summer it will rank as a most attractive combined trip, both for tourists and for general travellers who do not require to make the journey at all-rail speed.

### Minor Accident at London Bridge.

COL. A. C. TRENCH'S report to the Ministry of Transport on the accident



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which occurred on December 27, some 600 yards east of London Bridge station, Southern Railway, has been issued.

The 6.47 a.m. van train (steam hauled) from New Cross Gate to London Bridge ran past a signal at danger and came into sidelong collision with the 6.5 a.m. electric passenger train, which also was proceeding to London Bridge station and crossing the track of the van train. The engine and leading vehicle of the van train were partially derailed as were also the three rear vehicles of the electric train. One of these was tilted towards the adjoining track and struck and displaced the support of one of the girder structures which formerly carried the overhead electric wires of the single phase traction system (now superseded by third rail direct current). This girder fouled the up South London track and was struck by the 6.38 a.m. electric train Streatham Hill to London Bridge, the leading pair of wheels becoming derailed. This blow displaced the girder still further and a portion of it fell on the roof of the 6.55 a.m. electric train from London Bridge on the down South London track, and on the parapet walling of the viaduct, throwing some of the brickwork into the street below.

There were no serious injuries to staff or passengers. The engine of the van train was 4-4-2T No. B.15. Each of the three electric trains consisted of eight coaches. Responsibility for the accident is placed on the driver of the van train, who frankly admitted that he had made a mistake in reading the signal of the up local line in error for the adjoining signal of his own up through line. The report concludes with the following remarks:—

It is evident that the dislocation of traffic and possibilities of danger in this case were much enhanced by the existence of the overhead girder structures, and the desirability of the early removal of such disused structures on busy lines needs no emphasis I understand that the matter had previously been engaging the attention of the Company and that it is hoped to arrange for the removal of these at an early date.

The first collision would have been prevented by a system of automatic train control giving a full brake application at the stop signal, and, in principle, this accident provides a strong case in favour of such control in congested areas with dense traffic. There was no question of adverse climatic conditions or unfamiliarity with the road. On the other hand, this up-to-date installation of colour-light signalling gives particularly conspicuous and arresting indications. If, in these circumstances, an experienced driver carelessly permits himself to misread such indications, owing to momentary mental aberration, and if disciplinary measures fail to have the necessary deterrent effect, it seems difficult to provide against failure of the human element other than by automatic means.

## The Dinwoodie Accident.

LT.-COL. A. H. L. MOUNT'S report to the Ministry of Transport in regard to the accident on October 25 last between Dinwoodie and Wamphray, L.M.S.R., has been issued. The 7.30 p.m. "Royal Highlander" express from Euston to Aberdeen and Inverness, drawn by 4-4-0 Nos. 14435 and 1176, came into violent rear collision with the 1.20 a.m. down freight train from Carlisle to Dundee, which had been brought to a stand in the section owing to a minor mechanical defect in the engine, 4-6-0 No. 14631. The report is a lengthy one, and a good deal of attention is given to the reason why No. 14631 was in difficulties and the actions of various trainmen and signalmen concerned, together with signalling procedure.

So far as the engine No. 14631 is concerned, the report remarks that "an error of judgment, to say the least of it, on the part of a fitter, accounted for the stoppage of the freight train in section." It continues, "this was followed by failure on the part of guard Nicholson to carry out the protection of the train with zeal and celerity, and by gross neglect on the part of signalman Scott to exercise strict and unceasing attention in the performance of his simple though important duties. The signalman in advance, knowing the timing of the express, might well have initiated earlier inquiries in regard to the freight, which he knew was ahead of it, while the signalman in rear should also, in view of the suspicions which he entertained, have previously drawn attention to, and thus probably corrected, the unsatisfactory working which he had realised for some time was being adopted." Main responsibility is, therefore, attributed to the two men named, and is considered as "illustrative of the results of failure to appreciate that measure of conscientious service, which is so essential for the maintenance of the highest standards of co-operative efficiency and safe working."

## Southern Heights Light Railway.

THE Southern Heights Light Railway, which has recently been authorised by an Order of the Minister of Transport, has many features of interest. It is one of the few among the light railway promotions of the past few years which has many of the characteristics of an ordinary railway, and is in no sense a tramway or tramroad. Having a length of about 15¼ miles, the

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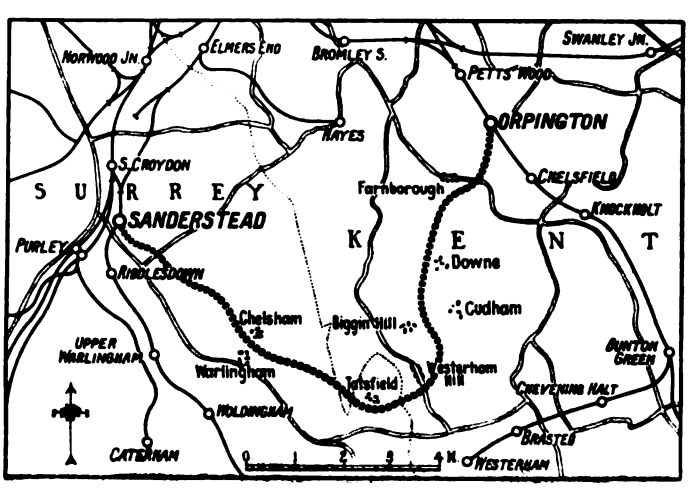
railway will make junctions with the Southern Railway at Orpington at one end, and at Sanderstead at the other, and will be electrically operated. It will serve an attractive district of Kent and Surrey which has hitherto been without railway facilities, and is likely to develop a good residential traffic. Starting from Orpington, the route taken will be by Farnborough (Kent), Downe, Biggin Hill, Tatsfield, Titsey, Warlingham and Chelsham to Sanderstead, and it will also be within easy reach of Cudham, Westerham and Titsey. There will be eight stations or halts, at Westerham Hill, Tatsfield, Hamsey Green, Chelsham for Warlingham, Green Street Green for Farnborough, Downe and Keston, Cudham and Biggin Hill, Mitchley Wood, and the railway will at first be single track only. Though privately promoted, the scheme has the support of the Southern Railway Company, which has agreed to work the line for 75 per cent. of the gross receipts and to guarantee interest at a rate not exceeding 5 per cent. per annum on a maximum of £330,000 debenture stock issued by the light railway company. The capital is to be £500,000, with borrowing powers to the extent of £330,000. This money is to be raised by the light railway company, which will construct the railway. The electrification will, however, be carried out by the Southern Railway Company, and the cost (estimated at £140,000) is to be paid by the light railway company either in cash or by the issue of fully-paid-up ordinary or preference shares, as may be agreed. The engineer and promoter of the scheme is Colonel H. F. Stephens, who has been associated with light railways all over the country.




**Metropolitan and Great Central Routes in Buckinghamshire.**

MR. J. R. HOLLICK and "Staffordshire Knot" send the following notes: "Considering first the Brill-Quainton Road section. This railway was originally the Oxford and Aylesbury Tramroad, and was to have reached Oxford beyond Brill. It actually terminated at the foot of Brill Hill. At present there are four trains each way per day, with one extra on Saturdays; none on Sundays. Apparently one engine in steam works the line. We were informed by the driver that the engine was shedded at Brill, where there is a shed with room for two locomotives. On a recent journey from Brill to Quainton Road, the engine was a Metropolitan 4-4-0 tank, No. 23, class A. It was rebuilt with a cab but still possessed pipes for condensing apparatus, presumably similar to the Mersey Railway locomotive mentioned in the March RAILWAY MAGAZINE. The train consisted of a goods truck and carriage, an old eight-wheeled Metropolitan coach, of a type formerly used on Circle steam services. The wheels were spoked, and there were no bogies, but radial trucks were used. It was third class only, with six compartments, all 'smoking,' with hard, padded, springless seats, and at one end a small brake compartment. At one time there had been no partitions between the compartments, as it was obvious that these had been added at a later date. There were no pictures or ornaments of any kind, no steam heating, and the continuous brake was not in use owing to the presence of goods wagons in front. Starting and stopping was therefore accompanied by fearful jolts.

"At Quainton Road, on sidings leading on to the Brill Line, were seen a similar Metropolitan carriage and two old Great Central six-wheeled carriages. These presumably form extra coaching stock for the line. The line is single, without any signals, except at Quainton Road at the junction with the main line. The level-crossings and sidings are operated by the train staff. There are four stations—Wood Siding, Wotton, Westcott, and Waddesdon Road. The first and third are conditional stops (when required) only. The

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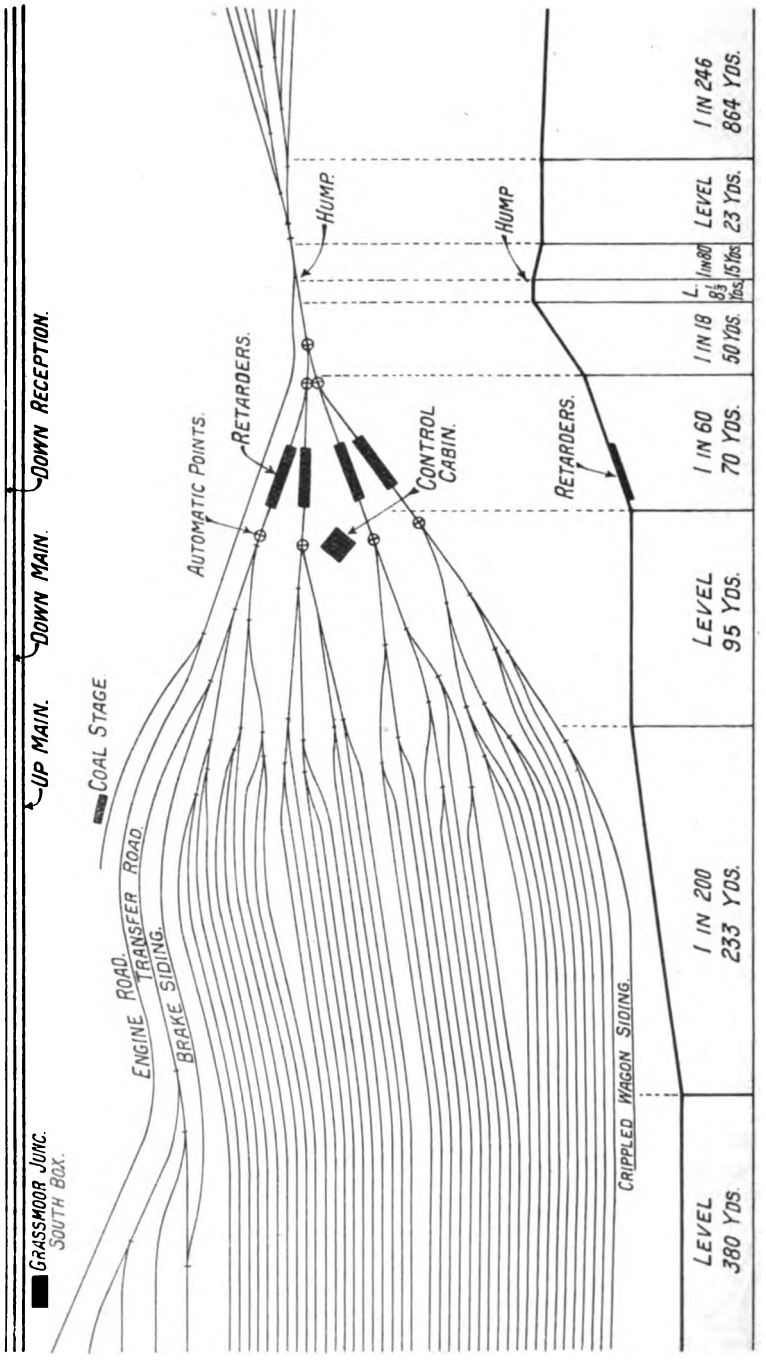


PLAN OF NEW SHUNTING YARD AT MARCH AS LAID OUT FOR HYDRAULIC BRAKE SYSTEM.

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G.W.R. Birmingham line passes under a Wood Siding, and the L.N.E.R. Wycombe route passes over at Wotton, with station adjoining. Before reaching Wotton, the line is joined on the left, junction facing towards Brill, by a single line, which the Ordnance Survey Map describes as a 'disused tramway," about two miles long, passing through Wotton Park to the road from Brill to the 'Crooked Billet' inn on Akeman Street. This terminus is 'en l'air' and gives the appearance of an intention of extending the route in the direction of Bicester. The burnished condition of the rails seemed to disprove the information afforded by the map. There are no signs of the route serving anything but a few scattered farms. Perhaps some readers could enlighten us on this matter."

## Quainton Road-Verney Junction Line.

OUR correspondents continue: "This, of course, has a much larger traffic, although passing through equally sparsely populated country. The trains were worked by a great variety of locomotives and stock. We have seen a motor train, one open coach, drawn by L.N.E.R. (late G.C.) 0-6-2T No. 5894, proceeding from Verney to Aylesbury; a similar combination standing at Verney, with small Great Eastern type 0-6-0 tank; and a large 2-6-4 Metropolitan tank, No. 114, working on goods traffic. We travelled in a handsome train of eight-wheeled Metropolitan stock through from Aldgate to Verney Junction, drawn, after changing engines at Rickmansworth, by engine No. 108, 4-4-4T. There is spacious siding accommodation at Verney alongside the sharply curved approach, but only one passenger platform, the outside of the L.M.S. down platform."

## Hydraulic Wagon Brakes at March Concentration Yard.

As briefly mentioned last month, Mr. H. N. Gresley, Chief Mechanical Engineer, L.N.E.R., recently read a paper to the Institute of Transport on this subject, and on the opposite page we reproduce a diagram showing the layout. Mr. Gresley's paper dealt with the controlling considerations, and with various aspects of the equipment very thoroughly, while he was also able to show a film (repeated after the paper had been read) showing the working of the system at Hamm Yard, Germany. There was also an illuminating discussion, and in the course of this, together with Mr. Gresley's reply, a number of other useful points were brought out. As will be seen from the diagram reproduced, the hump has a falling gradient, which at first is 1 in 18. Beyond the hump there are three sets of automatic points, together leading to four retarder tracks, each of which divides into two before the final fanning out of the classification tracks, which number 40. An interesting feature is that while in the reception sidings (10) a "cut card" is made out showing all the cuts to be made, and before a train is dealt with the operator in the control cabin sets the sequence of point movements for the whole train, so that the cuts follow in order more or less automatically. Two men are in control of the retarders, each having two, while special attention is given to ensuring the best visibility conditions. Pneumatic tubes enable the cards to be sent rapidly to the control cabin from either end of the reception sidings.

The equipment is necessarily elaborate, with track circuits for the important switches, and it was recognised that it could not be other than expensive. The plant has not been long enough in service for economic results to be deduced, but experience has shown that a train of 60 or 70 wagons can be shunted in about 25 cuts in 5 or 6 minutes, especially when the men have had more experience. The heating system installed has justified itself during the recent severe weather. An important factor is that the rail brakes are so designed that the retarding pressure is automatically adjusted according to load. Certain difficulties have, of course, had to be overcome, notably the fact that a proportion of older wagons have protruding bolt heads on the rims. These and other problems are, however, being met.

## Cascade Tunnel.

THE Cascade tunnel, on the Great Northern Railway, in the United States, has now been completed. Eight miles in length, it is now the longest tunnel on the American Continent, exceeding the Moffat tunnel in Colorado by two miles, and it has taken only three years to build, as compared with nearly five years for the Moffat tunnel. Being lined with concrete, it required a quarter of a million cubic yards of cement, and a million cubic yards of rock were removed by drilling and blasting. The tunnel forms part of a 30-million dollar improvement programme carried out by the Great Northern Railway, of which the remainder consists of the electrification of 73 route miles, including the tunnel itself, of the Cascade division of the line. The overhead contact system of the inclined

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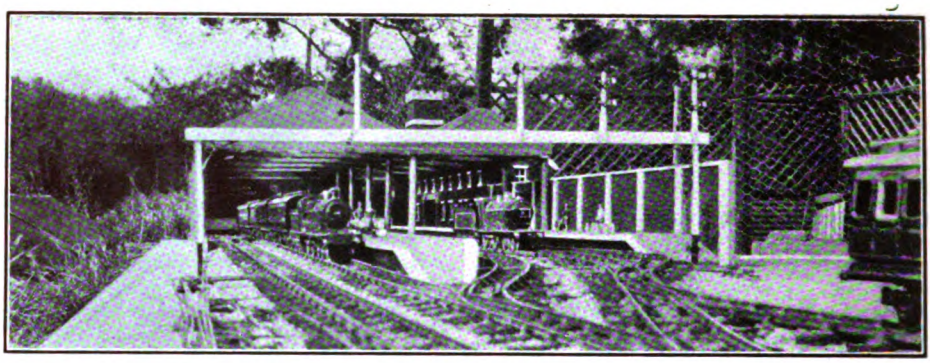
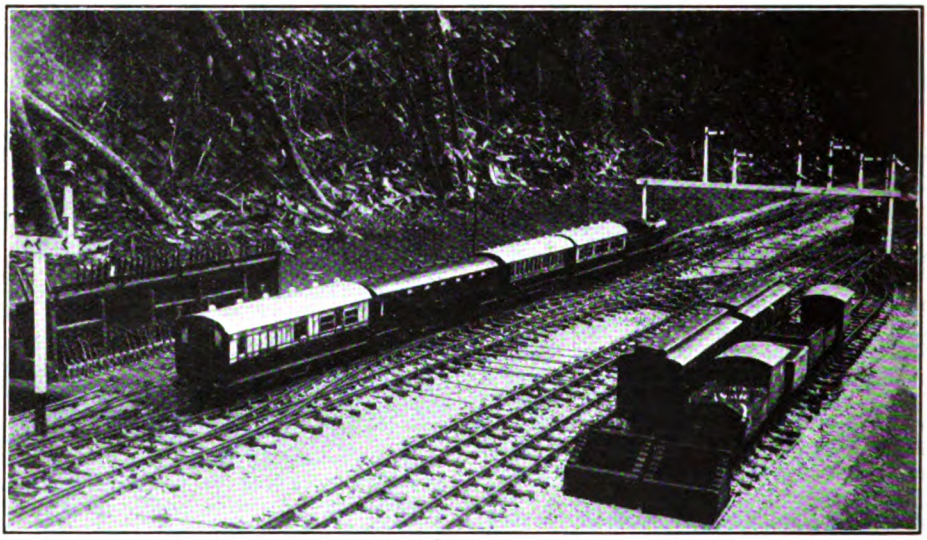


CARLISLE TERMINUS.



UP MAIN LINE TRAIN LEAVING PRESTON JUNCTION.

## VIEWS ON MR. S. R. C. WALMSLEY'S MODEL RAILWAY.

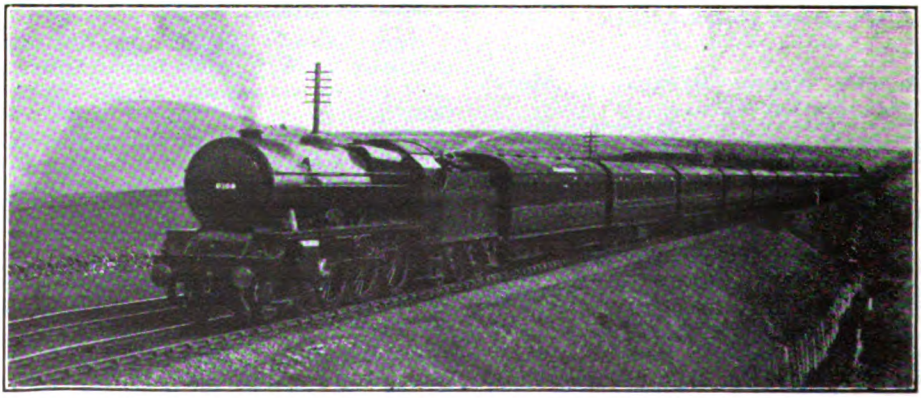


*Photo.*] [*Leslie J. Thompson.*

DOWN "ROYAL SCOT" EXPRESS NEAR SHAP SUMMIT,
4-6-0 No. 6108 "Seaforth Highlander."

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catenary type is of particular interest. The locomotives are of the motor-generator type, and two of them have now been in use for nearly two years on the original electrified section with very satisfactory results. They are interchangeable between passenger and freight service. Power is supplied from three independent sources, and every provision is made for extensions of electrification, and for unrestricted development of operation in train size, weight and speed.

### A Remarkable Railway Station.

WHAT will, on completion, rank as one of the most extensive and remarkable railway stations in the world is now being erected at Cleveland, Ohio, to serve the needs of several railway companies. A prominent feature of the design is its central tower, which forms a 52-storey structure with 560,000 sq. ft. of floor area. Contracts have been awarded for approximately 115,000 tons of steel required for the main station and other buildings within the area, street viaducts over the station, and bridgework on the approaches, this also including 3,450 ft. of four-track viaduct over an adjacent valley. The station, which will be served by both steam and electric trains, is of the through two-level type, all the tracks being on the lower level, whilst the waiting rooms, luggage, mail and other facilities are on the upper level. The permanent way layout provides for an eventual development of 34 tracks, the first 10 at the north to be used by the electric trains and the rest by the steam trains. The tower building is to be used mainly for offices, whilst the north-west wing comprises a large hotel, and the east wing, which will soon be under construction, is to represent a departmental store. The total excavation for the project amounted to about 3,000,000 cubic yards, of which only 300,000 cubic yards could be employed in embankments. The work of clearing the ground and starting on the first of the buildings was put in hand on January 1, 1922, and it is anticipated that the station, the cost of which is to be approximately £12,371,134, will be ready for use early in 1930.

### Customs Facilities at Victoria Station, Southern Railway.

ALTHOUGH about 30 per cent. of the registered luggage arriving by Continental trains at Victoria station makes use of the underground Customs examination room brought into use about two years ago, there is still a large volume of traffic travelling at the same time as the passengers for which the Customs examination takes place immediately after arrival. Admittedly, the accommodation for this traffic on the arrival platform is now inadequate, and, to some extent, complaints which have been made by the travelling public in regard thereto are recognised as justified. It has now been decided to roof over the whole of the platform at which the Continental trains arrive and to put an inner roof over that portion of the platform where the actual Customs examination takes place. This examination will, therefore, be carried out in an enclosed area, which will be heated by a special arrangement of steam pipes running under the platform and radiating heat through grilles let into the platform. This will be a very great improvement on the present arrangements, and will, no doubt, be appreciated by passengers arriving at Victoria from the Continent. It is expected that the work will be completed in time to be brought into use before the next winter season.

### An Interesting Model Railway.

MR. S. R. C. WALMSLEY sends the following notes descriptive of the two photographs reproduced:—

"It has always been my ambition, from a small boy, to build a model railway on more extensive lines than one generally meets with in the ordinary model world, and it was not until two years ago that my long-sought-for desire became a reality. With the help of our chauffeur, a very practical friend, and an up-to-date workshop, the line grew rapidly, so that now, except for one terminus, the railway is practically complete. My chief object has been to obtain absolute realism in every department, specially perhaps in the signalling branch. Such details as interlocking, blocks and bells have been included with considerable success. In fact, it is almost a complete signalling school in itself. I work upon L.M.S. principles, and I think I might venture to say that I have reproduced them fairly accurately.

"It will be noticed from the views reproduced that the line has been constructed out of doors. It is O gauge, and when complete will be over 130 yds. in length, thus allowing of scale distances between stations and blocks. There are three termini, one junction, and two intermediate stations, with signal frames of from 6 to 44 levers at each. The track is double most of the way, but a small section has been left single in order to illustrate single-line working. The substructure, viaduct, cuttings, bridges and turn-tables have all been constructed of reinforced concrete, but

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the station platforms and buildings are of wood. I might add, in conclusion, that all raw materials, such as brass rail, signal parts, etc., were obtained from the late Leeds Model Co., and I must admit that they have given me every satisfaction."

### From Manchester to Milford.

We have received from the L.M.S. Station Master at Carmarthen a note to the effect that our paragraph in the April issue as to the possible routes from Manchester to Milford had overlooked one connecting link which also would enable the travellers from Manchester to Milford, by the noon service, to reach Milford Haven the same night. This is the spur line from Llandilo, on the L.M.S. Central Wales line, to Carmarthen, where the branch trains of the L.M.S. Co. use the Great Western station. The Milford passengers would therefore travel in the through Swansea coach of the 12 noon ex-Manchester (London Road), waiting at Shrewsbury from 1.56 to 2.40 p.m., as far as Llandilo, reached at 5.47 p.m. ; thence the 6.5 p.m. " slow," all stations to Carmarthen, where they would be due at 6.56 p.m. ; so connecting with the same 7.50 p.m. to Milford Haven, arriving at 9.35 p.m. This is doubtless the route by which the passengers concerned were directed to travel, but it does not affect the interest of the fact that the erstwhile " Manchester and Milford Railway " would also have made the necessary through connection from Manchester to Milford in the shortest time practicable after midday.

Mr. E. J. Fasham, writing on the subject, suggests that, although the journey is a long and tiring one, it is a good route considering the cross-country nature.

### Halifax Corporation and L.M.S. and L.N.E. Railways.

The L.M.S. and L.N.E. Railway Companies announce that they have concluded with the Halifax Corporation an arrangement whereunder they become associated with the Corporation in the operation of certain of the existing omnibus routes, and take over from the Corporation entirely certain other routes. The Corporation omnibus routes confined to the borough remain under the control of the Halifax Corporation, but the following routes, which extend beyond the borough boundary, are now controlled by a joint committee of four representatives of the Corporation and four nominees of the railway companies:—Halifax — Huddersfield ; Halifax — Bailiff Bridge ; Halifax—Rippenden ; Halifax—Sowerby ; Elland—Sowerby Bridge ; Halifax—Brighouse and Lower Edge ; Halifax—Hebden Bridge and Heptonstall ; Halifax—Luddenden and Midgley ; Halifax—Beech Road (Sowerby Bridge). The arrangement provides for any omnibus services which may be developed further afield to and from Halifax to be operated by the railway companies.

The arrangements made provide harmony of working between the Corporation and railway transport interests in the area, so preventing wasteful competition, which is not in the public interest, and by the collaboration of the parties a number of improvements will be effected in the transport arrangements around Halifax. The Ryburn Valley, Sowerby, Beech Road, Midgley and Heptonstall omnibus services are being extended to Halifax (old) railway station, to give railway connections. The omnibuses leave the station approach four minutes earlier than the advertised town departure times, and proceed via Horton Street to their respective stands in Wards End or King Edward Street, according to timetable.

### The Western Wales Omnibus Co., Ltd.

More than half the population of Wales is affected by the second big road and rail-working agreement announced by the Great Western Railway and the South Wales Commercial Motors, Limited, whereby the latter undertaking is enlarged and its name altered to the " Western Wales Omnibus Co., Ltd." The new company takes over and operates the road services hitherto run by the South Wales Commercial Motors, Ltd., Messrs. Lewis & James, and the Western Valleys Motor Services, Ltd., together with all the routes operated by the Great Western Railway. This will provide intensive road facilities covering practically the whole of industrial Wales. The arrangement applies only in regard to passenger services. The authorised capital of the new company is £500,000, and the new board of the company consists of eight directors. Those nominated by the South Wales Commercial Motors are Mr. J. S. Austen (chairman), Mr. W. B. Cownie, Mr. H C. Drayton and Mr. F. E. Stanley, while the Great Western Railway representatives are the Rt. Hon. Lord Glanely, Mr. J. Milne, Mr. R. Cope and Mr. R. H. Nicholls. Working agreements in the South Wales area have also been concluded with the Caerphilly U.D.C., whose services operate in the Newport, Cardiff and Rhymney district ; Messrs. Roberts' Road Services, operating between Cardigan and Goodwick ; the Gloucester, Monmouth and

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Hereford Services, Ltd., whose services operate between Newport, Caerleon, Usk, Monmouth and Abergavenny ; the Aberdare Motor Services, operating between Aberdare and Merthyr ; and Messrs. Rossers' Services, operating between Newport, Monmouth, Usk, Abergavenny, Pontypool, etc.

### The Late Mr. R. W. Reid.

THE death, at the early age of 44, of Mr. R. W. Reid is in the nature of a tragedy and will be so regarded by everyone who

THE LATE MR. R. W. REID, C.B.E.

knew him either professionally or in his private life. The railway world in general, and the great British railway with which he was particularly identified, have together lost one of their most able exponents. Mr. Reid combined a high degree of technical skill and capacity for work with a charm of manner which endeared him to everyone who knew him. As Carriage and Wagon Superintendent, first of the Midland Railway and later of the L.M.S., he achieved great things at Derby, particularly in connection with the mass production of railway wagons, from which, added to the other important steps taken by him there, considerable economies in time and labour costs have resulted. When, in January, 1927, he assumed the higher and still more responsible post of Vice-President for Works and Ancillary Undertakings, which, in effect, made him chief of all the company's workshops and changed the scene of his activities from Derby to Euston, it was felt by all concerned, and, indeed, by everyone acquainted with railway matters, that he had entered upon a distinguished career likely to culminate some day in an appointment of an even higher description. Although he had only occupied the position of Vice-President for a little over two years, he had in that time added greatly not only to his reputation as a progressive and far-seeing railway officer, but had also increased, if that were possible, his acknowledged characteristics of kindliness, accessibility and good sportsmanship in his dealings with all ranks of the railway service.

### Earlier Holidays.

THE April issue of the *Railway Newsletter* discusses, first, various aspects of the " Earlier Holidays " movement. In regard to the general complaint that school vacations often govern the period when holidays can be taken, it is pointed out that, in Lancashire and Yorkshire, arrangements are sometimes made for a portion of the school holidays to be taken at the times of local " wakes " or town holidays, which occur at different dates between June and September. A similar spreadover scheme is thought to be applicable to other large towns, and possibly at a later stage to the London area. It is obvious that such arrangements would materially assist the railways in the working of summer holiday traffic and be of benefit to children and parents by ensuring more comfortable travelling and less congestion in seaside lodgings. It is pointed out that " summer time," the proposed stabilisation of Easter, and other innovations are gradually modifying the characteristic dislike of change of habit, and the hope is expressed that local education committees all over the country will sympathetically consider a relaxation of the rigid calendar of school holidays. Already holiday-makers who have a choice of date tend to avoid the most congested weeks, and if the desired modification of school vacation arrangements can be attained, the combined result should be a substantial easing of the holiday traffic problem in its most difficult phases, especially as the railways contemplate doing even more this year than in the past to render such spreadover arrangements attractive.

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STATION SCENE ON THE SOUTHWOLD RAILWAY.

## A.C. Electric Trains, Southern Railway.

REFERRING to a question raised by Mr. J. Walton, as stated on page 326 of the April number, Mr. J. Steffensen, writing from Denmark, comments as follows:—"I noticed the same noise myself when I travelled from Victoria to the Crystal Palace in 1924. I do not know anything about the electric equipment of these A.C. motor-vans, but the symptoms seem to point to the motors being asynchronous single-phase motors, which require a special starting winding on the stator. When this starting winding is 'on,' the motor makes a fair amount of noise until normal speed is reached, when the starting winding is ordinarily cut out. When I travelled by this line I noticed that the noise stopped by the time speed had been got up, so my experience does not completely cover your correspondent's. There is nothing to prevent the starting winding being kept in circuit all the time, but it is only necessary while accelerating. It could even be kept in during application of the brakes, as the tractive effort of the motor on the starting winding alone is quite small. The faint humming noise probably came from the static transformer, as suggested, such a transformer always being carried by electric locomotives for high-tension A.C. operation, as one does not like to have five or six thousand volts direct on the motors."

## Closing of the Southwold Railway.

THE closing of the railway of 8¾ miles between Halesworth and Southwold, which had been indicated as possible, actually took place on April 11, when both goods and passenger traffic were suspended. Opened on September 24, 1879, the railway would have attained its jubilee if it had survived a few more months, but its eventual disappearance, regrettable indeed, was almost an inevitable necessity under present-day conditions. From the start the railway was hampered by the fact that its gauge was 3 ft., and all goods and coal traffic interchanged with the main-line system at Halesworth station had to be transhipped. But it depended for the bulk of its traffic on passenger business, and this was very fairly maintained until April, 1928, when the Southwold Corporation licensed motor-coaches to pick up fares in its own boundaries. Being hindered by a speed restriction to 16 miles an hour, imposed by Board of Trade regulations, the railway could not compete effectively with motor-omnibuses, which have the legal right to run at 20 miles an hour. So recently as 1927 it carried as many as 81,704 passengers, as compared with 108,677 in 1913, and had a goods and coal traffic of 18,420 tons as compared with 13,808 tons in 1913. When the grouping of the main British railway systems was planned, it was not found possible to include the Southwold Railway in it, because of the difference of gauge, and it remained an independent undertaking. Communication between the London and North Eastern Railway at Halesworth and Southwold and intermediate points is being maintained by road services and through bookings for passengers, while goods-train traffic and parcels to and from Southwold will be dealt with at Halesworth station by road services.

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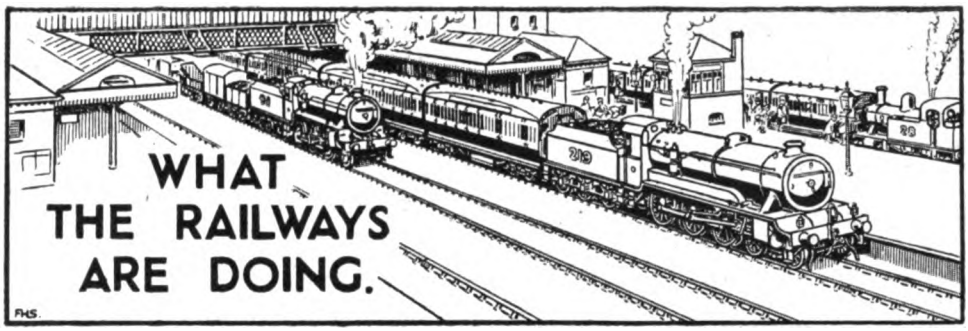


We are informed officially that Mr. Ernest Latimer has retired from the position of Managing Director of the Manchester Canal Company, but retains his seat on the Board of Directors.

Mr. F. A. Eyre, Secretary and Accountant, has been appointed General Manager, Mr. Mathew Kissane, Assistant Secretary, has been appointed Secretary.

Mr. H. O. Whitelegg, Assistant Accountant, has been appointed Accountant.

Mr. Herbert Mends Gibson retains his position as Chief Superintendent, and will, as heretofore, control the Commercial Section, including development of traffic and tolls, rates and charges.

Mr. William Browning retains his position as Traffic Superintendent in charge of the Administrative work of the Ship Canal and Docks.

* * *

Mr. Norris G. Bell, M.Inst.C.E., Railways Commissioner, Commonwealth Railways, Australia, is shortly retiring. He was appointed a Commissioner first in 1917, but his term of office was further extended in 1923, 1925 and 1927. Mr. George A. Gahan, who has been appointed Railways Commissioner, Australian Commonwealth Railways, in succession to Mr. Bell, has held the appointment of Chief Mechanical Engineer, Commonwealth Railways, with headquarters at Port Augusta, since 1919.

* * *

At the annual meeting of the Rating Surveyors' Association, held at the Surveyors' Institution on March 14, Mr. A. J. Brickwell, C.B.E., Estate and Rating Surveyor, L.N.E.R. (Southern Area), was elected President for the year 1929-30.

* * *

Mr. W. H. Morton, M.I.Mech.E., who has been appointed Chief Mechanical Engineer, Great Southern Railways, Ireland, in succession to Mr. J. R. Bazin, served his apprenticeship with Kitson & Co., locomotive builders, of Leeds, and received a comprehensive technical education at the Leeds University and at the Leeds School of Science and Technology. On completion of his apprenticeship he was employed by Kitson & Co. as a leading draughtsman, later becoming Assistant Works Manager with the same firm. In 1900 he was appointed Chief Draughtsman in the Locomotive Department of the Midland Great Western Railway of Ireland, and after filling the successive positions of Works Manager and Assistant Locomotive Engineer, eventually was appointed to the position of Chief Mechanical Engineer of that company. He acted in that capacity from 1915 to 1924. In the latter year, on the amalgamation of railways in the Irish Free State, Mr. Morton was appointed to the position of Deputy Chief Mechanical Engineer of the new company. His present appointment as Chief Mechanical Engineer, Great Southern Railways (Ireland), dates from April 5, 1929. Mr. Morton is Chairman of the Irish Central Wages Board, and was a member of the Departmental Committee set up in 1925 by the Irish Free State Government

**MR. W. H. MORTON,**
Appointed Chief Mechanical Engineer Great Southern Railways, Ireland.



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to report on the system and law of Workmen's Compensation.

* * *

MR. C. COWLEY has been appointed Secretary of the Antofagasta (Chili) and Bolivia Railway Co., Ltd., and of the Chilian Northern Railway Co., Ltd., to fill the vacancies caused by the death of the late Secretary, Mr. A. H. Clinch.

* * *

MR. SAMUEL M. VAUCLAIN, President of the Baldwin Locomotive Works, Philadelphia, U.S.A., has been elected Chairman of the Board of Directors. Mr. George H. Houston, formerly a Director of the Baldwin Locomotive Works, has been elected to succeed Mr. Vauclain as President.

* * *

MR. FREDERICK DOWNES, who has been appointed Signal and Telegraph Engineer, Southern Area, L.N.E.R., in succession to Mr. A. F. Bound, was appointed Telegraph Superintendent, Southern Area, L.N.E.R., in April, 1924. Prior to that he had a corresponding position on the late Great Northern Railway. He entered Great Northern service in the Telegraph Department in June, 1887; was transferred to the Telegraph Headquarters Staff in May, 1890, as a draughtsman; in 1903 became Technical Inspector, and in 1912 was promoted to be Assistant to the Telegraph Superintendent. On January 1, 1913, he succeeded Mr. T. Ireland as Chief of the Telegraph Department. During his career Mr. Downes has been associated with a number of important developments in the application of electricity to railway working, particularly under the late Mr. James Radcliffe and Mr. T. Ireland, as also in connection with railway telegraphy, signalling, general and train lighting, and track-circuiting. The first example of the last-mentioned was installed at King's Cross in 1893. Mr. Downes was awarded the Rosebery Medals in 1903 and 1904 for essays on "Railway Electrification" and "Railway Signalling" respectively. He is an Associate Member of the Institution of Electrical Engineers, Member of Council of the Institution of Railway Signal Engineers, of which Institution he was President 1925-26, and in 1922 was President of the Railway Engineers' and Telegraph Superintendents' Conference.

*Elliott]* **MR. F. DOWNES,** *[& Fry.*

Appointed Signal and Telegraph Engineer, Southern Area, L.N.E.R.

**MR. C. CARSLAKE,**

Appointed Assistant Signal and Telegraph Engineer, Southern Area, L.N.E.R.

* * *

MR. C. CARSLAKE, who has been appointed Assistant Signal and Telegraph Engineer, Southern Area, L.N.E.R., was appointed Assistant Signal Engineer in 1926, having previously held the position of Outdoor Assistant in the same department since May, 1924. Prior to that he was Assistant Signal Superintendent of the late Great Central Railway and of the G.C. Section of

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the L.N.E.R. Mr. Carslake was formerly in the employ of the British Power Railway Signal Company, during which time he had charge of the electrical side of the pneumatic signalling installations at Salisbury and Basingstoke, to Woking and Staines on the then London & South Western Railway, and also the installations between Manchester and Godley on the Great Central. In 1906 he was made Assistant Signal Superintendent of the Great Central Railway and remained in that position up to 1924. In May, 1924, he was appointed Outdoor Assistant to the Signal Engineer, Southern Area, L.N.E.R., as above mentioned.

* * *

MR. GUY JONES has been appointed Road Motor Engineer, Southern Area, under the jurisdiction of the Chief Mechanical Engineer, L.N.E.R. He was formerly in Great Western Railway service, where he became an Assistant to the Superintendent of the Road Transport Department.

* * *

COLONEL SIR JOHN W. PRINGLE, C.B., Chief Inspecting Officer of Railways, Ministry of Transport, will retire on May 23 next under the age limit, and the Minister of Transport has appointed Lieut.-Colonel A. H. L. Mount, C.B.E., who has been employed as an Inspecting Officer of Railways for the past nine years, to succeed him.

* * *

MR. J. R. BAZIN, who has retired from the position of Chief Mechanical Engineer, Great Southern Railways, Ireland, was appointed Chief Mechanical Engineer, Great Southern & Western Railway, Ireland, in November, 1921, in succession to the late Mr. E. A. Watson. Prior to that he had been Works Manager at Inchicore, to which office he was appointed in May, 1919. Mr. Bazin was educated at Berkhamsted, and in September, 1897, entered Doncaster Works, Great Northern Railway, as a premium apprentice. After being engaged for three years on shop work, he was transferred to the running department, where he spent a considerable time attached to running sheds and firing on locomotives. He was then appointed an Acting Inspector in the Locomotive Running Department until March, 1905, when he became Assistant to the London District Locomotive Superintendent in charge of Hornsey shed. In August of the same year he was appointed Assistant District Locomotive Superintendent at Colwick, Nottingham, being transferred in September, 1906, to a corresponding appointment at Peterborough. In May, 1908, Mr. Bazin was appointed Assistant Works Manager at Doncaster, and in March, 1916, became Acting Carriage and Wagon Superintendent.

* *

MR. WILLIAM J. HORNE, District Superintendent of the Great Northern Railway (Ireland) at Amiens Street, Dublin, has retired owing to ill-health, and is succeeded by Mr. John Henry Scott, Assistant for Staff and Labour to the Traffic Manager.

* * *

L.M.S.R. APPOINTMENTS.

We have been advised officially of the following appointments:—

*Chief Goods Manager's Office.*

Mr. P. L. Gold, Goods Agent, Leicester, to be Assistant District Goods Manager, Wolverhampton.

Mr. M. Hewitt to succeed Mr. Gold as Goods Agent, Leicester.

Mr. T. H. Allis to succeed Mr. Hewitt as Goods Agent, Birmingham Central, and Monument Lane.

Mr. S. Roberts to be District Goods Manager, Wolverhampton, *vice* Mr. W. A. Thomas, retired.

Mr. C. J. Sykes succeeds Mr. Roberts as Assistant District Goods Manager, Liverpool.

Mr. G. McKell to be Assistant to District Goods Manager (Cartage), Liverpool.

Mr. J. O. Hignett to be Assistant to District Goods Manager (Operating), Liverpool.

Mr. W. Sheppard to be Goods Agent, Birkenhead.

Mr. R. A. B. Warren to be Goods Agent, Bankfield and Canada Dock.

Mr. T. D. L. White to be Goods Agent, Sandon, North Docks and Huskisson.

Mr. C. Bowring to be Goods Agent, St. Helens.

Mr. H. Tandy is appointed Assistant Irish Traffic Manager, Dublin.

Mr. T. Burke is appointed Commercial Assistant, Dublin.

Mr. J. Murphy is appointed Livestock Representative for Ireland, I.T.M.O., Dublin.

Mr. D. Toomey is appointed District Traffic Agent, Cork.

Mr. W. T. Aldred is appointed Town Agent, D.G.M.O., Manchester.

Mr. T. Arnold is appointed Chief Claims Clerk, D.G.M.O., Manchester.

Mr. A. S. L. Thomson to be Assistant Dock Superintendent, Garston Docks, *vice* Mr. A. Sutherland, retired.

Mr. H. P. Aggleton to be Chief Clerk, District Goods Manager's Office, Birmingham, *vice* Mr. Heighes, deceased.

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Mr. A. Tyrell to be Goods Agent, Coventry.

*Stores Department.*

Mr. B. J. Harding is appointed Staff Assistant, Euston.

* * *

We are also advised of the following new L.M.S.R. appointments:—Chief Goods Manager's Department: Mr. C. Devey is appointed Assistant to District Goods Manager, Manchester. Chief General Superintendent's Department: Mr. S. E. Parkhouse is appointed District Controller, Willesden; Mr. L. P. Ball is appointed District Controller, Birmingham; Mr. F. H. Fisher is appointed District Controller, Stoke; Mr. C. Phizackerley is appointed District Controller, Liverpool; Mr. H. C. Tyler is appointed Assistant District Traffic Superintendent, Swansea. Scotland: Mr. J. Becket to be Stationmaster, Ardrossan and Ardrossan North; Mr. J. Blair to be District Traffic Agent, Edinburgh. Chief Civil Engineer's Department: Mr. T. C. McCallum to be Assistant to Divisional Engineer, Derby; Mr. F. W. Jones to be Chief Assistant (New Works), Derby; Mr. P. H. Johnson to be Chief Assistant (Permanent Way), Derby; Mr. G. E. Fisher to be Assistant to Divisional Engineer, Crewe.

* * *

Mr. Arthur Jeffkins, who retired from L.M.S.R. service on December 31 last, joined the L.N.W.R. as an apprentice in the Traffic Department. He was transferred to the Goods Department at Broad Street in 1893. In February, 1899, Mr. Jeffkins was transferred to the Chief Goods Manager's Office at Euston, and was eventually appointed Chief Clerk to the Outdoor Goods Manager in 1913. In May, 1914, he was appointed head of the "Out-of-Gauge" Department of the Chief Goods Manager's Office, and on the formation of the Welfare Department in 1923 he was attached to that section. To mark the occasion of his retirement he was recently presented with a handsome bookcase and a clock. The presentation was made by Mr. W. Clower.

* * *

Mr. R. A. C. Henry, who has been appointed Deputy Minister of Railways in Canada, previously held the appointment of Director of the Bureau of Economics of the Canadian National Railways.

* * *

We regret to record the death in New York of Mr. Samuel Rea, President of the Pennsylvania Railroad, U.S.A., from 1913 to 1925, when he retired at the age of 70.

We regret to record the death of Mr. T. E. Harland, formerly Superintendent of the Line, Taff Vale Railway.

* * *

A direct descendant of George Stephenson, the pioneer of railways, Mr. Herbert Baker Stephenson, died recently at St. Leonards, Sussex, at the age of 85 years.

* * *

Reductions of 3s. 6d. and 5s. on the single and return fares to the Lorna Doone country are announced by the Great Western Railway. The journey is by rail to Minehead and thence by connecting road motor coach to Lynton to Lynmouth. The reductions apply to the week-end tourist and ordinary fares, a difference of 4s. 6d. being made in the case of the excursion fare. As an example, the week-end fare, Paddington to Lynton and Lynmouth, has been reduced from 61s. 9d. to 56s. 9d. first class, and 43s. to 38s. third class, and the excursion fare from 41s. to 36s. 6d.

* * *

Since the beginning of the year, five additional halts have been opened on the G.W.R., viz.:—"Burn (for Butterleigh)," between Cadeleigh and Up Exe; "Oldfield Park," between Bath and Saltford; "Oaksey," between Kemble and Minety; "Cold Harbour," between Tiverton Junction and Uffculme; and "Pans Lane," between Patney and Chirton and Devizes.

* * *

The Great Western Railway has placed an order with Alexander Stephen & Sons Ltd., Linthouse, Glasgow, for the construction of a new steamer for their Fishguard-Rosslare and Channel Isles services. The vessel will be about 290 ft. in length, will burn oil fuel, and will be propelled by single-reduction geared turbines. She will be able to carry 1,000 passengers, and a feature of the design is the provision of six cabins *de luxe* on the boat deck. There will also be 15 single-berth cabins on the promenade deck and 31 two-berth cabins on the main deck. She will have a speed of 19 knots.

* * *

One hundred and seventeen men were entertained by the Southern Railway Company at the Cannon Street Hotel recently. They had all seen over 50 years' service, and Sir Herbert Walker, General Manager, presented them with long-service medals. Only 34 have retired since November last, and the remaining 83 are still working, although their average age is 65 years. Six medals for acts of heroism,

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including the rescue of a deaf and dumb man from beneath an express, in which the rescuer—Gateman Goff, of Southampton—was injured, were also presented.

* * *

THE London Midland & Scottish Railway Company are issuing a set of three attractively designed and coloured posters, one of which—that reproduced on this page—relates, as will be seen, to the collection, carriage and delivery of parcels. The three carriers depicted are in blue, and the "parcels" they carry are in light red, the letterpress being in blank and the background a daffodil yellow. The remaining posters are more or less fanciful interpretations of the golfing and tennis facilities at Turnberry and the "Royal route."—L.M.S. to Scotland.

* * *

THE ninth Institute of Transport Annual Dinner was held at the Savoy Hotel, London, on Thursday, March 14, the President, Air Vice-Marshal Sir Sefton Brancker, K.C.B., A.F.C., occupying the chair. The Honorary President, H.R.H. the Prince of Wales, K.G., K.T., honoured the Institute by attending, and there was a very large and distinguished gathering, the total number present being 474.

* * *

THE L.N.E.R. coastal wireless station at Parkeston Quay and the three new steamers for the Continental route via Harwich to the Hook of Holland, *Vienna*, *Prague*, and *Amsterdam*, are to be equipped with the latest type of Marconi valve transmitting apparatus. The interrupted continuous wave (I.C.W.) method of signalling will be used with these transmitters.

* * *

THE L.N.E.R. Exhibition of Poster Art at the New Burlington Galleries closed on March 21. It was visited by many distinguished people and members of both Houses of Parliament, and from many parts of the world, as will be noticed from the following taken at random from the address column of the book—Munich, Budapest, Sydney, Melbourne, Wellington, N.Z., Canada, United States, Dresden, Italy, Monte Video, Amsterdam, Rotterdam, Jamaica. The remarks made in this book emphasise the increasing interest that is being taken in this annual event and in art for commercial purposes. It is learned that many hun-

A CLEVER L.M.S.R. POSTER.



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dreds of posters were purchased and the supplies of the L.N.E.R. Holiday Handbook were quickly sold out.

* * *

THE Housing Committee of the L.C.C. has approved a scheme formulated by the L.M.S.R. for improved transport facilities for the Becontree Estate. It is stated that it is intended to provide a service of steam trains to and from Fenchurch Street at convenient times; a service of electric trains, by the extension of the existing lines, from Barking to Dagenham; and a service of steam trains to and from Broad Street.

* * *

ON Saturday, March 16, the Railways Athletic Association held its annual programme of Five Miles Cross-Country Championships at Ruislip, Middlesex. The R.A.F. Record Office was used by the kind permission of the Air Officer, Commanding Inland Area, of the Royal Air Force. There was a large field, and some good performances were put up. Among those present were Mr. P. H. Price, O.B.E. (Starter), and Mr. E. E. Painter, of the Railway Clearing House; Mr. W. G. Pape, O.B.E., S.R.; Mr. W. E. C. Lazenby and Mr. W. J. Blake, L.M.S.R.

* * *

THE first electric passenger train service was run over the following sections of the G.I.P. Railway, India, as follow:—Byculla to Kurla (through lines), September 17, 1928; Thana to Kalyan (local and through lines), November 12, 1928; Kurla to Thana (through lines), November 12, 1928; Victoria Terminus to Byculla (through lines), November 12, 1928.

* * *

THE L.N.E.R. announces that additional motor-boat services between Harwich and Felixstowe and Harwich and Shotley now operate every evening. Fares have also been reduced as follows:—Harwich and Felixstowe, 6d.; Harwich and Shotley, 4d.; Felixstowe and Shotley, 10d.

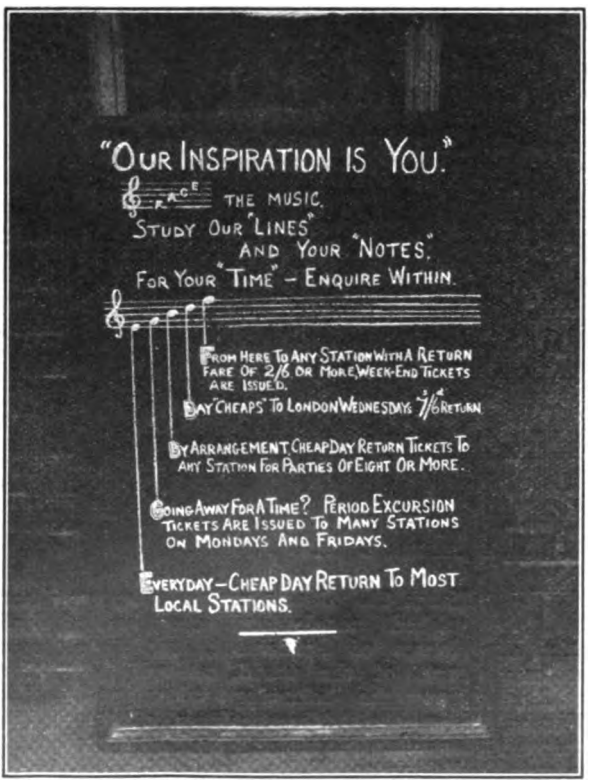
* * *

THE Southern Railway Company has informed the Town Clerk at Hastings that the directors have sanctioned the reconstruction of Hastings station at a cost of £202,000, and that the work will be put in hand as soon as possible. This is in addition to preparatory work costing £68,000. The surroundings of Warrior Square station are also being discussed with a view to improvement.

* * *

MR. C. R. CLINKER explains that the new halt between Bath and Saltford opened by the G.W.R., as stated in the March number, is named Oldfield Park, and serves the district of that name, though actually situated at Brook Road. The platform was opened on February 18. A new halt at Pans Lane, between Devizes and Patney and Chirton, was opened on March 4. He also emphasises the differences between halts and platforms, particularly on the G.W.R. The

**INGENIOUS PUBLICITY ON THE SOUTHERN RAILWAY.**


"OUR INSPIRATION IS YOU."
FACE THE MUSIC.
STUDY OUR "LINES"
AND YOUR "NOTES."
FOR YOUR "TIME" – ENQUIRE WITHIN.
FROM HERE TO ANY STATION WITH A RETURN FARE OF 2/6 OR MORE WEEK-END TICKETS ARE ISSUED.
BAY "CHEAPS" TO LONDON WEDNESDAYS 7/6 RETURN
BY ARRANGEMENT CHEAP DAY RETURN TICKETS TO ANY STATION FOR PARTIES OF EIGHT OR MORE.
GOING AWAY FOR A TIME? PERIOD EXCURSION TICKETS ARE ISSUED TO MANY STATIONS ON MONDAYS AND FRIDAYS.
EVERYDAY—CHEAP DAY RETURN TO MOST LOCAL STATIONS.

One of a series of smart advertisements designed by Collector Bray, of Worthing, to advertise cheap tickets. *The Southern Railway Magazine*, to which we are indebted for the photograph reproduced, states that Collector Bray's various blackboard announcements have attracted considerable attention.

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former are usually long enough to allow of use by ordinary trains. There is generally a staff. Platforms are, however, shorter and generally used by rail motor cars, no staff being provided.

* * *

THE new platform accommodation at Twerton, on the old main line of the G.W.R., between Bath and Saltford, was informally inaugurated in February. The accommodation virtually provides a wayside station. An official is constantly in attendance while the platforms are open, and facilities are given for the issue of tickets and for dealing with parcels traffic. The new platforms are known in the time-tables as Oldfield Park.

* * *

FOLLOWING the settlement of the "Roman question," it is announced that the new Vatican precincts will be known internationally as "Citta del Vaticano," or "Vatican City." This name will be printed on international maps and will be recognised by foreign governments. The Italian Government will construct a special railway to the port of Civita Vecchia, which will be internationalised to give the Pope an outlet to the sea. This railway will not form part of the Papal property, but will be simply a special Vatican branch line of the Italian State Railways reserved exclusively for the use of the Vatican.

* * *

MR. R. B. Tollinton, writing from Tendring Rectory, Essex, mentions having noticed in the waiting-room at the Hook of Holland an announcement as follows:—

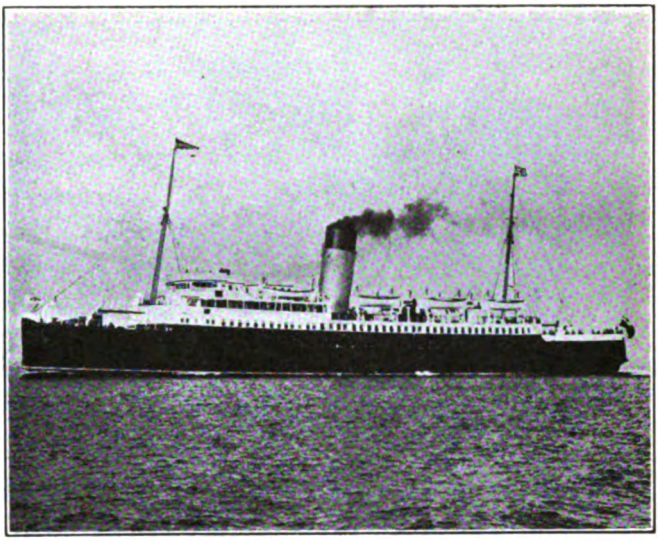
FINEST SCOTCH
SODA WATER.

* * *

THE L.N.E.R. has placed a contract with the Sentinel Waggon Works Limited, Westminster, for eighteen Sentinel shunting locomotives.

* * *

MR. A. J. NEWBERRY points out that in the list of Southern Railway electric train Head Codes given last week the letter "S," denoting Charing Cross—Tattenham Corner trains, has two dots over it.



NEW SOUTHERN RAILWAY STEAMER "CANTERBURY" UNDERGOING TRIALS ON THE CLYDE.

A NEW departure in travel has been inaugurated by the L.M.S.R. in the form of a combined rail-and-'bus ticket between Glasgow and Largs via Gourock, or *vice versa*. At a cost of 4s. travellers can go from Glasgow to Gourock by train, from there to Largs by 'bus, and then home again by rail.

* * *

THE Southern Railway Company is issuing a striking new coloured poster, calling attention to the "Golden Arrow" Pullman train, with special boat service from May 15. A broad arrow, chiefly of a distinctly golden hue, is the poster's leading feature, and in this a train running at full speed is ingeniously suggested. Some neatly tabletted letterpress gives the times of departure from London and arrival in Paris, and *vice versa*.

* * *

THE Transport Observation and Models Society will visit the L.M.S. Locomotive Depôt at Plaistow on May 15. Full particulars of the Society or a copy of "The Transport Observer," under which title the Society's bulletin is now published, can be had from Mr. S. M. W. Hann, Hon. Secretary, Frensham, 7, Shirley Road, Croydon.

* * *

MR. H. G. LAWLOR points out that South Town station, Yarmouth, is in Norfolk and not in Suffolk, as suggested in the article on "The Norfolk Lines of the L.N.E.R." He points out that the county border is about one mile south of the station.

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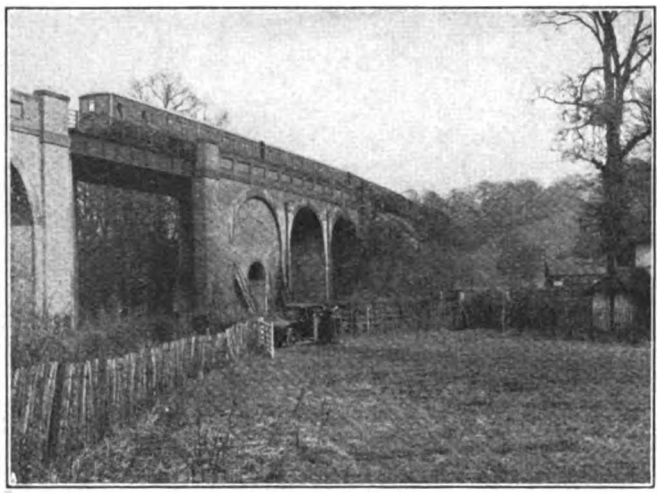

A PICTURESQUE VIEW OF A SOUTHERN RAILWAY METROVICK-EQUIPPED TRAIN BETWEEN PURLEY AND SMITHAM.

THE London & North Eastern Railway has placed the following orders:—Two suburban trains of quintuple-unit carriages with Clayton Wagons, Ltd.; two suburban trains of quadruple-unit carriages with the Birmingham Railway Carriage and Wagon Company, Ltd.; one suburban train of quadruple-unit carriages with the Metropolitan-Cammell Carriage, Wagon and Finance Co., Ltd.; one suburban train of quadruple-unit carriages with Craven's Railway Carriage and Wagon Co., Ltd.

* * *

THE SOUTHERN RAILWAY announces that after a period of experimenting with loud speakers at London Bridge, it has been decided to make them a permanent part of the organisation for handling the homeward rush-hour traffic. The loud speakers are installed on platforms 1 and 2. They will be used to impart information regarding incoming trains. At present they will be used from 4 p.m. to 8 p.m., Mondays to Fridays; and 12 noon to 3 p.m., Saturdays. They will not be used on Sundays.

* * *

IT is anticipated that, owing to motor-omnibus competition, the Garstang and Knott End Branch, L.M.S.R., which joins the L.M.S.R. main line at Garstang, will be closed. This is one of several small lines absorbed into the L.M.S.R. system. Prior to grouping, it was operated as an independent company, having been opened for traffic in 1870. When taken over, the length was 11¼ miles, and four locomotives, 10 coaching vehicles, and 50 goods vehicles were in use.

INSTEAD of holding their usual Spring Concert at the Queen's Hall in London, the L.N.E.R. Musical Society this year visited Norwich, where, on April 6, the St. Andrew's Hall was filled to capacity, under the chairmanship of Mr. William Whitelaw, Chairman of the company. The Society's full orchestra, numbering about 100 players, and the combined male voice choirs from London, Cambridge, Doncaster, Ipswich, Lincoln, Norwich, Peterborough, York, etc., were present, as usual for the London concert, and gave splendid performances throughout a well-assorted and extremely interesting programme. Miss Noel Eadie was the only soloist. The conductors were Mr. Edgar R. Wilby and Mr. R. J. Maddern Williams, F.R.C.O., except that Mr. Sydney Harrington, F.R.C.O., conducted one of the items, for the setting of which he had been responsible. Mr. H. A. Bennett, F.R.C.O., and Mr. Harrington divided the duties of organist, while Mr. Harrington accompanied as necessary on the piano.

* * *

A LECTURE on "Freight Trains" will be given to the Wimbledon Model Railway Club on May 27 by Mr. A. Early. Full particulars of the Club can be had from the Hon. Secretary, 27, Bernard Gardens, Wimbledon, S.W.19.

* * *

THE L.N.E.R. announces that additional motor-boat services between Harwich and Felixstowe and Harwich and Shotley now operate every evening. Fares have also been reduced as follows:—Harwich and Felixstowe, 6d.; Harwich and Shotley, 4d.; Felixstowe and Shotley, 10d.

* * *

AN interesting experiment in high-speed railway travel was carried out between Paris and Cherbourg on April 3, with a view to testing possibilities of quicker services. The experimental train consisted of a 4-6-2 locomotive with two *de luxe* corridor cars, and one luggage van. The journey was accomplished in 3 hours 18 minutes, making an average start-to-stop speed of 72 miles an hour, while at times the train reached a speed estimated at 93 miles an hour.

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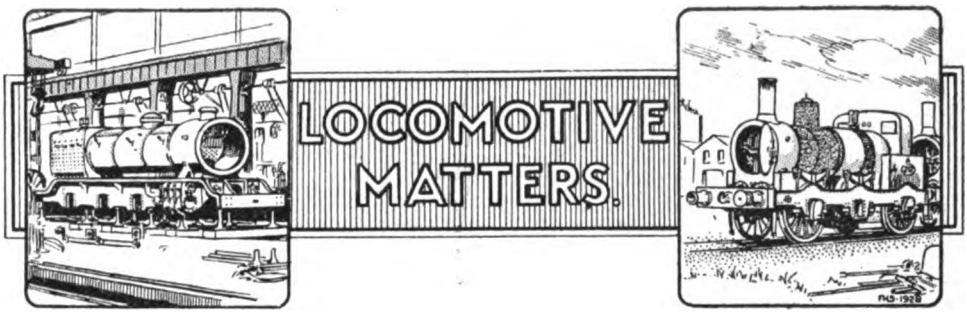


## L.M.S.R.

0-6-4T No. 2003, not 2023 as stated in the March number, has been working into Manchester (Central). " Prince of Wales " class Nos. 5727 and 5728 were noted on Liverpool-Manchester trains via Lymm, on duties usually taken by lighter engines, including " Renowns." At Ordsall Lane, Manchester, I noted recently three engines standing close together—L.M.S. 4-6-0 No. 8704 ; L.N.E. 0-6-0 No. 1275 ; and G.W. 2-6-0 No. 4324.—[R. DYSON.]

2-4-0 No. 1 is working in the Birmingham district. Midland 0-4-4T No. 1278 has been working the Dudley-Dudley Port branch. Several " Precedents " have been noted working on Midland routes in the Birmingham district. 4-4-0 No. 702 (black) was noted with the tender (red) of No. 701.—[W. R. BROWN.]

At Edinburgh on March 16 (Rugby International) " Royal Scots " Nos. 6128 *Meteor* and 6130 *Liverpool,* compound 4-4-0 No. 1011 and Caledonian 4-4-0 No. 14430 were noted on trains from Carlisle. The All-Pullman Special from Glasgow was worked by Caledonian 4-4-0's No. 14468 and 14315.—[A. W. A. WATSON.]

Claughton's Nos. 5912 *Lord Faber,* 5915 *Rupert Guinness,* 5917 *Charles J. Cropper,* 5979 *Frobisher,* and 5933 and 5976 (unnamed) have been adapted for working north of Carlisle.—[" REDGAUNTLET " and S. W. BAKER.]

The Manchester—Llandudno Club Train is now generally worked by " Claughton " engines Nos. 5994 and 5995.—[C. H. INGHAM.]

The only remaining DX 0-6-0's are now Nos. 8014, 8029, 8051, 8058 and 8060. Particulars are desired of the " Jumbo " 2-4-0's still in service.—[" REDGAUNTLET."]

0-6-0T's Nos. 16586-9, 16591 and 16593 are on the Wirral section.—[R. DYSON.]

Three of the new " G3 " class 0-8-0 superheater freight engines ex-Crewe are now working from the Crewe South shed, Nos. 9500-2. The first of the series, No. 9500, was noted en route to Derby on February 28, presumably for inspection purposes. Nos. 9500-9 are understood to be all for service on this section. New 0-6-0 standard shunting tanks ex-Beardmore's have been delivered up to No. 16747, thus leaving two others yet to come. Of this series, Nos. 16700-29 are Midland division engines, the remainder, Nos. 16685-99 and 16730-49, being all Western division (L. & N.W. section).

It is reported that the Irish Mail workings will shortly be taken over by engines of the rebuilt " Claughton " type fitted with Caprotti valve gear. At present they are worked by the corresponding rebuilds fitted with Walschaerts motion, of which there are six stationed at Holyhead. L.T.S. 4-6-4T No. 2100 has been broken up at Crewe. Other withdrawals include N.S. " 100 " class 0-6-0 No. 8667 and 0-6-2 coal side tank No. 7581.—[C. WILLIAMS.]

## L.N.E.R.

G.E. 4-6-0 No. 8563 recently worked into Manchester (London Road) on a Marylebone-Manchester express, though possibly only from Sheffield. No. 5110 *King George V* has been working C.L.C. expresses.—[R. DYSON.]

Nearly all the N.7 0-6-2T's of the 400, 800 and 900 series have left the G.N. section in London. Nos. 2637-41 of the 2632 series were seen at Hatfield about Easter. Class N.1 0-6-2T's have replaced Nos. 2632-36 on the Hatfield branches. G.C. 4-6-2T's at King's Cross are Nos. 5129, 5448 and 5452. G.E. 0-4-4T's Nos. 8100 and 8124 worked from Hatfield for a time. 4-6-2 No 2750 *Papyrus* has been noted on goods trains. G.C. Nos. 6164 *Earl Beatty,* 6165 *Valour* and 6101 have been noted at King's Cross on excursions. On April 1, No. 6165 worked the second of two trains arriving 10.30-10.45 a.m. " Immingham " class 4-6-0 No. 6098 worked the first. Information is desired as to numbers of N.E. 4-8-0T's, 4-6-2T's and 4-4-4-T's.—[BM/OVN6.]

4-6-2 No. 2565 *Merry Hampton* has been through Cowlairs works. G.E. 0-6-0T



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No. 7057 is in Scotland. The West Highland fish express from Mallaig, usuallly worked into Edinburgh by a "Shire" or N.B. 4-4-2, recently arrived behind 0-6-0's Nos. 9771 and 9778. Sentinel-Cammell car No. 31 *Flower of Yarrow* is at Edinburgh. 4-6-2 No. 4480 *Enterprise*, after attention at Cowlairs, temporarily worked Edinburgh and Glasgow expresses. The new carriage-cleaning sheds at Craigentinny are now practically completed. 0-6-0 No. 9659 *Gough* was noted at Portobello, where also Nos. 9648 *Mons* and 9661 *Ole Bill* have been observed. No. 9673 *Maude* is at Haymarket. N.B. 4-4-2's Nos. 9510 and 9870 have names on rear splashers, others on front splashers. New 1929 "Shires" Nos. 352 *Leicestershire*, 2755 *Berkshire*, 2756 *Selkirkshire*, and 2757 *Dumfriesshire* have been noted in service. No. 2758 *Northumberland* is now in service. No. 2754 is *Rutlandshire*. The special "Battlefields Pilgrimage" from Glasgow to Harwich was worked to Edinburgh by No. 6388 *Captain Craigenwell* and taken on by No. 2401 *City of Kingston-upon-Hull*. Rail car No. 32 *Fair Maid* is at Stirling. No. 36 *Royal Eagle* is in Edinburgh.—[C. M. FURST and J. D. BLAIR.]

G.N. 4-4-2's Nos. 4433, 4449 and 3295 have been noted at Swindon on trains from Sheffield.—[E. MOUNTFORD.]

Mid-Suffolk Light Railway Nos. 1, 2 and 3 were allocated L.N.E.R. Nos. 8315, 8316 and 8317. No. 2 was, however, scrapped and not renumbered, so that No. 8317 is No. 3. Obviously, Mr. J. F. W. Boughton is incorrect in suggesting that the G.E. 2-4-2T's of the 8090 class (now type F3) were known as "Jubilee Tanks," as No. 1090 came out in 1893, not 1897. These came out in order, 1893-1895; 1090-1099, 1080-1089, 1070-1079, 1060-1069, 1040-1049. There were no 1050-1059 engines of this class. The 1500 class came out: 1500-4 in 1911; 1905-15 in 1913; 1517-1532 in 1914; 1533-1538 in 1915; 1539 in 1917; 1540-1570 in 1920; and 8571-80 in 1928.—[V. C. C.]

No. 2802 *Walsingham* is transferred to Parkeston, from Gorton. She has been noted on the "Hook Continental." No. 8900 *Claud Hamilton* is now painted black.—[H. G. LAWLOR.]

No. 7210 is an outside cylinder 0-4-0T, and is at Stratford works; also No. 7230.—[A. CRAWSHAW.]

No. 7126 is still a 0-4-0T, as noted at Stratford, where also Nos. 07126 and 07129 were seen in the yard and works respectively.—["2800 SANDRINGHAM."]

Rumours which appear to have gained currency among locomotive enthusiasts to the effect that No. 3253 G.N. small Atlantic had been scrapped, and that the last two of the "Shire" class of the 1927-8 batch were to be compound engines are unfounded. 3253 is stationed at Mexborough, G.C. The "Shire" 4-4-0 locomotives 336 and 352 recently turned out are fitted with a special valve gear worked in conjunction with Lentz poppet valves. They are named respectively *Buckinghamshire* and *Leicestershire*. The previous six, numbered 318, 320, 322, 327, 329 and 335, have Walschaert's gear and Lentz valves. Two of the 4-cyl. 4-6-0 G.C. express engines are being fitted with Caprotti gear. New Pacific No. 2750 *Papyrus* came to King's Cross shed on March 3, while No. 2751 *Humorist* was out at Doncaster shed on March 11. No. 2748 is to be stationed in Scotland. The last of the present series is No. 2752 *Spion Kop*. Further "N2" 0-6-2's, ex Hawthorn, Leslie & Company, to 2676 are at work on the G.N. London suburban traffic. Pacific No. 2561 *Minoru* worked the Grand National Pullman special throughout from King's Cross to Aintree and back on March 22; Driver T. Atkins. The non-stop race special from King's Cross to Lincoln, via Grantham, on March 20 and April, loaded to 16 corridor and restaurant cars, weighing 550 tons full, and was hauled by Atlantic No. 4438 and 4-4-0 No. 4330. Pacifics are not permitted upon the Grantham-Lincoln line. In connection with the making of a British cinematograph film, No. 4472 *Flying Scotsman* worked a composite special train as required on the Hertford-Stevenage loop line in March and April, running down each morning with her train via Wood Green and Cuffley, returning by the same route each evening with corridor tender leading. 4-4-0's Nos. 4334 and 4338, and 2-6-0 No. 4668 were also employed. L.N.E.R. Nos. 1-12 are electric 0-4-4-0 engines, No. 13 is the 4-6-4 electric and steam engines begin at 14. Mr. C. Selby Wilkinson is therefore in error in describing "C" 0-6-0's as being numbered 4-10.—[R. A. H. W.]

Several other readers point out that the steam engines which had Nos. 1-13 were renumbered. "Belmont" gives the following particulars:—1-356, 2-1450, 3-1451, 4-974, 5-975, 6-1453, 7-979, 8-467, 9-503, 10-358, 11-blank, 12-1457, 13-40.—[ED., R. M.]

New "Pacifics" Nos. 2743-47 and 2750 are at work on the G.N. section. No. 2745 *Captain Cuttle*, after making its debut on this section, appears to have been transferred elsewhere. Nos. 2744 *Grand Parade* and 2746 have

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been employed principally in working the "Flying Scotsman" expresses, Nos. 2743 *Felstead* and 2747 *Coronach* being engaged chiefly in the haulage of the fast and heavy Leeds trains. No. 2748 *Colorado* has been noted on both Scottish and Leeds trains. "Shire" class 3-cyl. 4-4-0 No. 245 *Lincolnshire* is still at work on the G.N. section, and hauled the up Leeds train due King's Cross 1.5 p.m. on February 26, with a load of over 400 tons, and the 5.37 p.m. down Hull express on March 14.—[F. A. HILLIER.]

The 8 a.m. Newcastle-London express was recently worked by a 4-6-2 to York and taken on by Raven 4-4-2 No. 2167 to Grantham. "Shire" 4-4-0's are working between York and Sheffield, as well as between York and Newcastle.—[JOHN FOX.]

G.C. outside-crank 0-6-0's Nos. 5495, 6425, 6445 and 6434 have been scrapped. A recent visitor to Manchester was L.D.E.C.R. 0-4-4T No. 6406. Specials of two coaches worked by Pollitt 4-4-0's are sometimes run from Manchester to Liverpool when Midland (L.M.S.) trains miss connections with C.L.C. expresses.—[C. J. 17435.]

G.N. 4-4-2's Nos. 3272, 3276, 3280, 3295, 4412, 4420, 4428 and 4451, with G.C. Nos. 6031 and 6042, have been noted on C.L.C. expresses. G.N. 0-6-0ST's Nos. 3962, 3968, 4205-6, 4265 and 4273 are working on C.L.C. services in the Manchester district.—[R. DYSON.]

The original 0-4-0 tanks were Nos. 209 and 210, built by Neilson about 1874; Nos. 227 and 228, built at Stratford about 1897; and Nos. 229, 230 and 231, built at Stratford about 1903. These engines were saddle tanks with 12 in. by 20 in. cylinders, 3 ft. 7 in. driving wheels, and 140 lbs. pressure. Unfortunately, I have not my records, but am quoting from memory, and may be slightly inaccurate. Most of them have since been scrapped; only Nos. 7230 and 7231 remain. In 1913 No. 227 was built. This is a side tank, with 17 in. by 20-in. cylinders, 3 ft. 10 in. drivers, and 180 lbs. pressure. This was classed B.74 on the G.E. list. In 1914 two more were built with a shorter chimney, dome and cab; these were classed B.77. Two more were built in 1920. Now, the remaining saddle tanks are class Y.5 and the B.74 and B.77 are all Y.4 class. The numbers of the new tanks are 7226, 7227, 7228, 7229 and 7210, built in 1914, 1913, 1914, 1920, and 1920 respectively. The 0-4-0 tram engines are class Y.6 (old G.15), and are as follows:—Nos. 7132, 7133, 7134, 07125, 07126 and 07129. The newer ones, 0-6-0 with outside cylinders, are class J.70 and numbered 7125-7131, 7135-7139. The 0-4-0's are nearly all at Wisbech, and the others are at Ipswich and Yarmouth. I might add that there was no question of rebuild, for the 0-6-0's were all entirely new; in fact, the two classes have nothing in common.—["8401."]

Nos. 7135-7139 were built as 0-6-0T, but G.E. Nos. 125-134 were 0-4-0T, the first seven being later replaced by new 0-6-0T. None were rebuilt as 0-6-0T. The list is now: 07125-6-9, 7132 and 7134, 0-4-0T's; 7125-6, 7129, 7136-7-8-9, 0-6-0T's.—["BELMONT."]

## G.W.R.

Several 2-6-2T's (31XX renumbered 51XX), also some 0-6-2T's, are now working in the London area and from Slough and Reading. Engines recently through Swindon include No. 320 (domeless 0-6-2T), while among those which are presumably to be scrapped are Nos. 3214 (double-framed 2-4-0) and 1325 (2-4-2T, Rhymney No. 66). Crane engines Nos. 16 and 18 are 0-6-4 and No. 1299 a 2-4-0.—[R. WEBSTER.]

0-4-2T No. 3580 is working on the West Kirby-Hooton Joint line.—[R. DYSON.]

On Easter Monday a down express was noted headed by Nos. 4093 *Dunster Castle* and 4090 *Dynevor Castle*.—[S. W. BAKER.]

The following new engines have been turned out of the Swindon Works since February 8:—Nos. 4911 *Bowden Hall*, 4912 *Berrington Hall*, 4913 *Baglan Hall*, 4914 *Cranmore Hall*, 4915 *Condover Hall*, 4916 *Crumlin Hall*, 4917 *Crosswood Hall*, 4918 *Dartington Hall*, 4919 *Donnington Hall*. Also goods 2-6-2T, Nos. 5570 to 5574. The following new engines have been received from the North British Locomotive Co., Ltd., Glasgow:—Goods 0-6-0T, Nos. 5708-17, 5730-35, and 5737.—[G.W.R. MAGAZINE.]

0-6-0T's Nos. 28 and 359 are named *Cleobury* and *Hilda* respectively.—[E. MOUNTFORD.]

Nos. 4019 *Knight Templar* and 4060 *Princess Eugenie* are at Worcester.—[KING EDWARD *VII*.]

"Hall" class engines now work most passenger trains between Plymouth and Penzance, except the "Cornish Riviera," on which a "Castle" or "Star" is generally used.—[H. G. M. ROGERS.]

No. 4900 is *St. Martin*, previously 2925, not 4904.—[ED., R. M.]

## S.R.

No. E859 *Lord Hood* is now running. Urie 4-6-0's Nos. E736-742, 744 and 746 now have 21-in. by 28-in. cylinders. Nos. E542 and B200 have been scrapped. B302 has been working on the Eastern

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Section, while B276 is on the Western Section. Of the 30 Drummond 0-6-0's, 28 have been rebuilt, but Nos. E306 and E355 were in original condition when last seen. All the Drummond 6 ft. 7 in. 4-4-0's were rebuilt at the end of 1928, except Nos. E290-E299 and E710.

No. E860 *Lord Hawke* is now in service. Nos. E741, 745, 746, 749, 753 and 755 of Urie 6 ft. 7 in. class, E476 of 6-ft. class, E504 of 5 ft. 7 in. class, and E518-519. 4-6-2T, now have Ashford type superheaters, while Nos. E736 to 744 and 746 have cylinders reduced from 22 in. to 21 in. in diameter. New "School" 4-4-0's will be numbered E900 to 909. "King Arthur" class 4-6-0's Nos. 763, 764, 765, 766, 768, 770 to 772 and E852-853 have new large pattern six-wheeled tenders, while Nos. E858 to 860 have Urie type ex the foregoing "King Arthurs." No. A625 is the latest 6-ft. 2-6-0 in service. Nos. A610 to 625 are all at Guildford, A805 to 809 at Nine Elms, A800 to 804 at Redhill, and A790 to 799 at Brighton. The new 0-8-0T No. A950 is now at Bricklayers Arms, and A951 is at present running trials at Brighton. No. B678 0-6-0T is being altered for the Isle of Wight. No. B276 0-4-2 has reduced bunker capacity, retains Stroudley boiler, and is going on the Lyme Regis branch of the Western Section. Nos. B176 and 200 (0-4-2's) are scrapped. Nos. B171, 322 and 323 4-4-0's have recently been fitted with C3 class boilers with flat domes and whistle on safety valve mounting instead of in cab roof. B39 4-4-2 is running with red background to number plates. Ten of the 0-6-2T's of E1 R class are now in service, and besides working the Halwill and Torrington line they are used on local goods from Exeter to Exmouth and Sidmouth.—["E745 TINTAGEL."]

The Duke of Gloucester's special from London to Bournemouth on March 19 was worked by No. E773 *Sir Lavaine*. New 0-8-0T No. A951 is at Brighton.—["783 SIR GILLEMERE."]

One engine only remains in old Brighton livery, namely, E1 class (Stroudley) tank No. 607B. Built at Brighton in October, 1876, numbered and named 107 *Alderney*, she still retains a boiler of Stroudley design, and is generally in excellent external condition. No engines remain in the Brighton passenger livery, No. 607 being painted and lined in Mr. Marsh's goods black. Shedded at New Cross, No. 607 is the Willow Walk pilot. At the time of writing (April 2) she was observed still upon this duty. Several engines of Isle of Wight ("W") Section are now running with name-plates, and present a very smart and well-cleaned appearance, which is distinctly refreshing.—[O. J. MORRIS.]

The following is a complete list of Isle of Wight locomotives bearing names:—W1 *Medina*, W2 *Freshwater*, W3 *Carisbrooke*, W8 *Bembridge*, W10 *Cowes*, W11 *Newport*, W12 *Ventnor*, W13 *Ryde*, W16 *Wroxall*, W19 *Osborne*, W20 *Shanklin*, W21 *Sandown*, W22 *Brading*, W23 *Totland*, W24 *Calbourne*, W25 *Godshill*, W26 *Whitwell*, W27 *Merstone*, W28 *Ashley*, W29 *Alverstone*, W30 *Shorwell*, W31 *Chale*, and W32 *Bonchurch*. Nos. W19 to W32 are Adams 0-4-4T's; W1 a 0-6-0ST; Nos. W13 and 16 the remaining Isle of Wight Railway engines. Nos. W2, 3, 10, 11 and 12 are "Terrier" 0-6-0T's; and No. W8 I.W.C. 2-4-0T.—["783 SIR GILLEMERE" and C. G. WOODNUTT.]

### Somerset & Dorset Joint Railway.

New 4-4-0's under construction at Derby will, presumably, be Nos. 47-49. 0-6-0T No. 23 recently worked to Bournemouth West.—["783 SIR GILLEMERE."]

Eighteen engines have been withdrawn 1928-9:—0-6-0's Nos. 19, 20, 21, 22, 23, 24, 25, 26, 28, 33 and 8; 4-4-0's Nos. 15-6; 0-4-4T No. 52; 2-4-0T No. 28; 0-4-2T No. 25A; 0-4-0T's Nos. 26A and 45A. Twelve new engines are in service:—The Derby-built 4-4-0's Nos. 44-6; the new 0-6-0T's Nos. 19-25, built by Bagnall; and Nos. 101-2, 0-4-0 Sentinel type.—[G. J. COGHLAN.]

### M. & G.N. Joint Railway.

Details of Midland & Great Northern Joint locomotives given in the January issue, and contradicted last month, were those supplied to me by the Resident Mechanical Engineer's Department at Melton Constable in an official letter.—[R. W. FITZJOHN.]

Acknowledgment and thanks are also made to the following correspondents, though their notes are not used:—F. J. T., E. S. Tonks, "Teduan," J. H. Orton, R E. Daniells, E. J. Davey, "K. M. B.," R. A. Jackson, J. N. Turner, "King Edward VII," N. W. Routledge, K. Davison, and "8666 Plynlimmon."

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THE RAILWAY MAGAZINE.]

**"QUEEN OF SCOTS," PULLMAN EXPRESS, L.N.E.R.**

**Passing Werrington Troughs. 4-4-2 No. 4404,**

**(From a Photograph by H. Gordon Tidey)**

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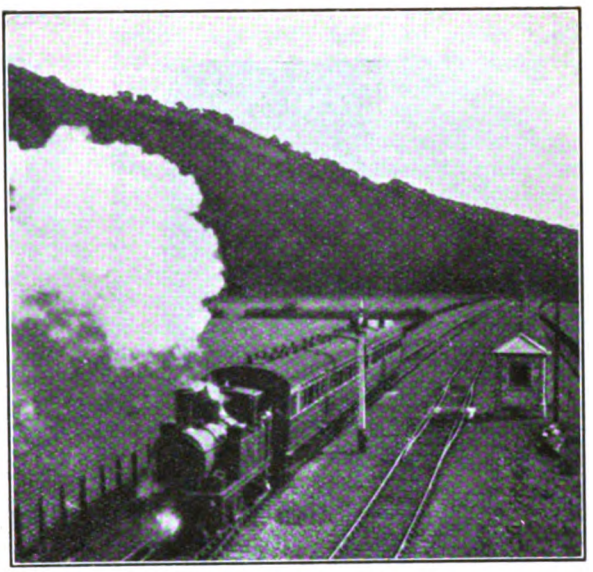
# The Teign Valley Branch of the G.W.R.

By G. N. SOUTHERDEN.

(*Photographs by the Author*).



AUTO-TRAIN LEAVING CHRISTOW

THE Exeter to Heathfield Branch of the Great Western Railway, generally known as the Teign Valley Branch, was built in two parts: the southern portion of 7¾ miles, from Heathfield to Christow, by the Teign Valley Railway Company and the northern part (8¾ miles long), from Christow to Exeter, by the Exeter Railway Company. Both these railways have been always worked by the Great Western Railway, and ranked as subsidiary companies in the 1923 amalgamations.

*The Teign Valley Railway,* begun at Heathfield on the Moretonhampstead Branch, progressed very slowly and in many stages, for want of capital, and at times for years on end nothing was done. Eventually the line to Ashton was opened for traffic on October 9, 1882. Later it was extended to Teign House Sidings, but the extension was for goods traffic only, viz., coal to sidings for the villages round, Christow, Bridford, Doddiscombesleigh and Dunsford, and farm produce in the reverse direction to Newton Abbot, Torquay and other markets.

The opening of the Teign Valley Railway was described in *Trewman's Exeter Flying Post* for Wednesday, October 11, 1882; the following are extracts:—

After nearly twenty years of waiting and many vexatious disappointments, the little line of railway running through the rich and lovely valley of the Teign has at last been brought to a successful completion, and was formally opened on Monday amidst great rejoicings. The line was projected about twenty years ago for the purpose of developing the mineral wealth of the Teign Valley, in the neighbourhood of Teign House, Ashton, and Christow by connecting them with the South Devon Railway at Newton.* The scheme promised well, but for various reasons was not carried out. . . . The line follows the course of the river, and it was thought at one time that it would be continued beyond Newton to Torquay* in order to afford accommodation for shipping ore from the mines in the valley. The scheme now most in favour is to extend the line upwards to the city of Exeter.† . . . Trains commenced running on Saturday, and the ordinary weekday service has been arranged so as to give four journeys each way, starting from Ashton at 7.10, 10.55, 2.10 and 7.5, and from Newton Abbot‡ at 8.27, 12.0, 5.35 and 8.25. All trains are third class, but only the first and last will carry passengers at Parliamentary fares. The formal trip to celebrate the opening was made by the midday train on Wednesday.

In the same issue the desirability of the extension to Exeter was urged in an editorial paragraph, which also refers to the many vicissitudes of the line, mentioning that even after it was made "no

*Note* (*).—Both the Moretonhampstead and Torquay Branches were in existence when the Teign Valley Railway was opened.

*Note* (†).—"The Exeter Town Council unanimously adopted a resolution affirming the necessity for an immediate extension of the Teign Valley Railway to Exeter."—*Flying Post,* October 18, 1882.

*Note* (‡).—Presumably the Teign Valley trains ran only to Heathfield, passengers changing there into the Moretonhampstead Branch trains.



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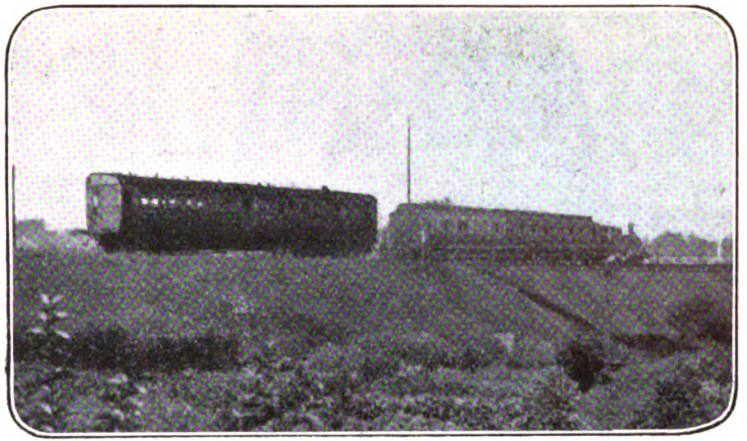
TEIGN VALLEY RAIL MOTOR AT EXETER (ST. THOMAS).



RAIL MOTOR AND MOTOR TRAIN PASSING AT CITY BASIN JUNCTION, EXETER.

RAIL MOTOR AT IDE

RAIL MOTOR AT LONGDOWN.

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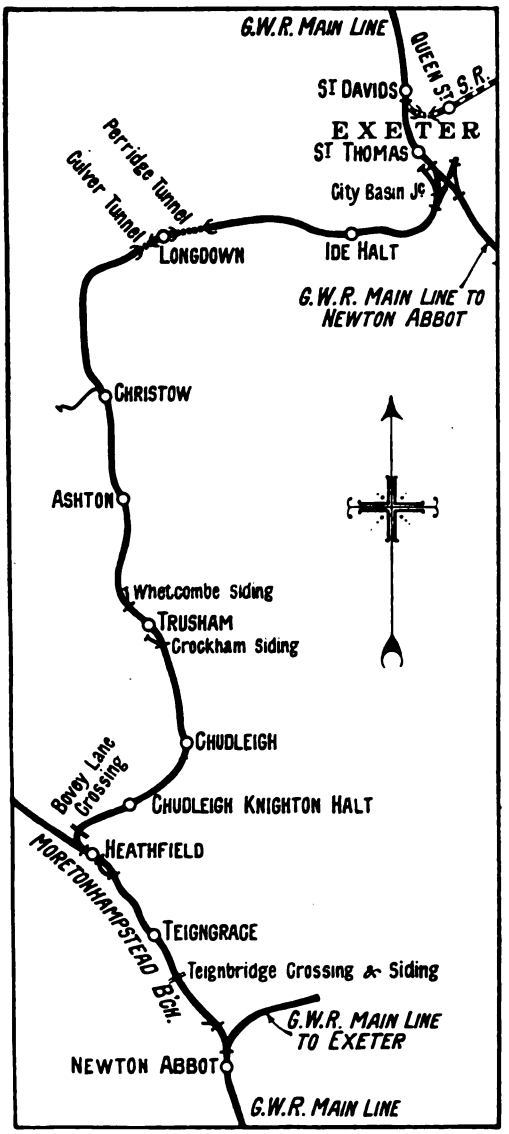


means could be found to work it until the Great Western Railway Company agreed to take it over."

The line was so many years in course of construction that it is reputed to have had an Act of Parliament for every mile and a lawsuit for every acre bought. In addition to developing the valley, it is said that the idea once was to run the line up the Teign Valley and thence to join the London and South Western Railway somewhere between Crediton and Yeoford Junction. This would have provided a direct route from South to North Devon, not only for local goods traffic but for coal, &c., from South Wales (in conjunction with shipping lines).

The following brief description is of the railway just previous to the construction of the Exeter Railway, but there were probably few changes (except the extension to Teign House) since its opening:—

The line was standard gauge, single throughout, and the stations (for passengers and goods) were Heathfield, Chudleigh, Trusham and Ashton, and Teign House Sidings for goods only. At Heathfield the line ran to a dead-end; there was no through junction with the Moretonhampstead Branch. At Ashton was an engine shed. Teign House Sidings were situated adjoining the south side of the overbridge which now exists at Christow Station: no men were kept there, it being worked by the station-master or a porter from Ashton. The whole railway was worked on the ("ordinary") staff system.

The *Exeter Railway*—formerly known as the Exeter, Teign Valley and Chagford Railway when a branch to the latter place was included in the scheme, but afterwards abandoned—was begun in November, 1893, and was opened for traffic July 1, 1903. This railway was fully described with photographs and gradient profile in the RAILWAY MAGAZINE, Vol. 13, p. 139 (August, 1903). It may be mentioned here, however, that a few months after construction had begun the company got into financial difficulties and the contractors agreed to take debentures. The total cost was about £350,000. The line involved very heavy cuttings and banks, about 25 under and overbridges and about 30 culverts, and was remarkably different from the old Teign Valley Railway which ran throughout along the bottom of the valley of the Teign. The Exeter Railway was built for single line, but land was taken and fenced in for double line and all bridges *over* the line constructed for double line.

At one time the construction of a railway from Heathfield to Ashburton and Brent was considered, so that an alternative main line might be available from Exeter to Brent which avoided the Dainton inclines. Since this line was never built, the Teign Valley route from Exeter to Newton Abbot compares very unfavourably with the comparatively level



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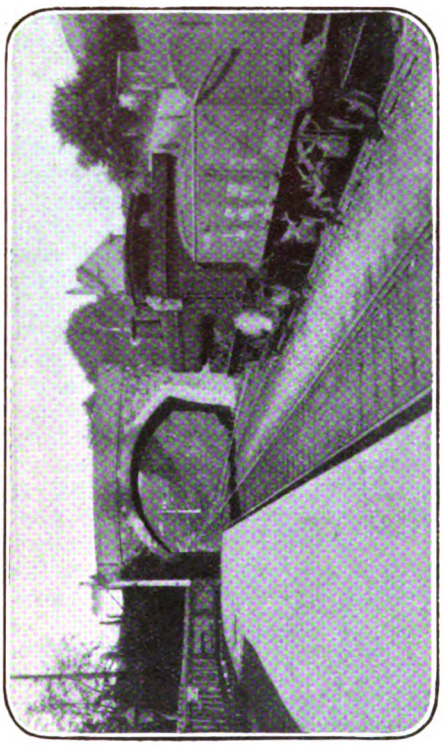
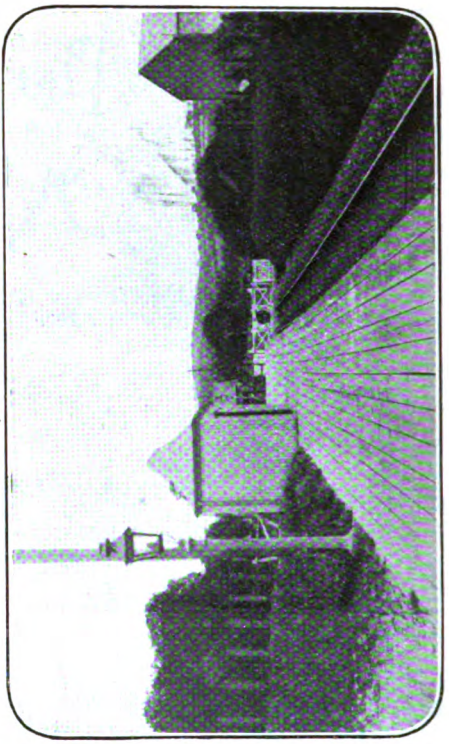
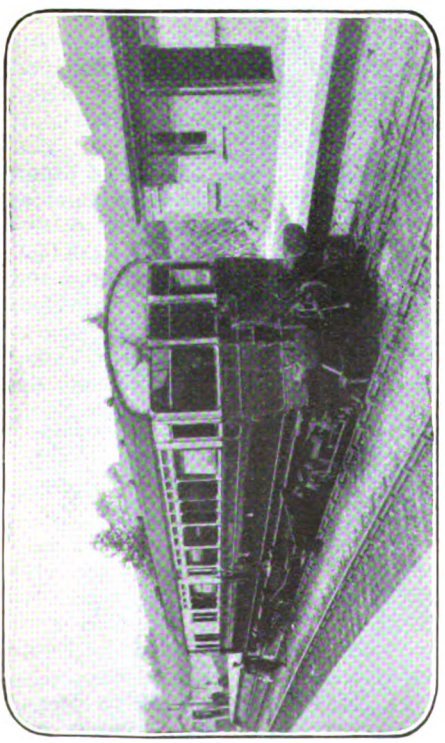


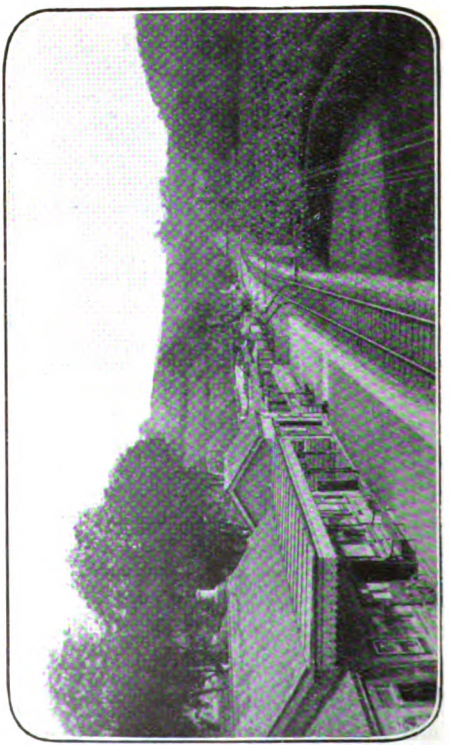
0-6-0T SHUNTING AT TRUSHAM.



CHUDLEIGH KNIGHTON HALT.



RAIL MOTOR AT CHRISTOW.



CHUDLEIGH, LOOKING SOUTH.

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main line along the coast. Now, however, the Teign Valley can be used as an emergency route for main-line traffic if occasion demands, *e.g.*, as happened during the landslide between Dawlish and Teignmouth in 1923. (See the RAILWAY MAGAZINE, Vol. 54, p. 410, May, 1924.)

The importance of the Teign Valley Branch to-day is chiefly due to the large roadstone traffic. Valuable road stone was known to exist in the Teign Valley, and quarries were opened at Trusham, one of them by a Mr. Maker, succeeded by the Teign Valley Granite Company, the other by Mr. J. H. Dickson, who later formed the Devon Basalt and Granite Company, and to whom the writer is indebted for many of the historical notes. Mr. Dickson, Civil Engineer, who superintended the construction of the Exeter Railway, while the latter was under construction, discovered basalt at Bridford, near Christow, where a quarry was opened and a railway to Christow Station laid down. Later, another company, Scatter Rock Macadams, opened a quarry and installed an aerial ropeway from there to Christow Station, where special sidings and plant were also laid down. Through the enterprise of these firms the road stone is sent over considerable distances and its reputation is second to none in the country.

Barytes is also quarried at Christow, and it is expected that traffic in this will increase.

The branch actually diverges from the main line at City Basin Junction, but as Exeter, St. Davids, is the terminal point for both passenger and goods trains, the main line used by Teign Valley trains will be briefly described. At St. Davids Station most trains depart from the down main platform (No. 1), though sometimes Nos. 3 or 4 are used. Arrivals are made at any of the up platforms available, *i.e.*, Nos. 4, 5 or 6. A mile south of St. Davids is St. Thomas Station, which deals with local passenger traffic; it has an all-over roof, and an air of departed glory is suggested by the rather imposing station yard and the disused first-class booking office. There is a signal box, crossover and siding. Since recent signal alterations the up home signal is not reached until after the station is passed. For some distance on each side of the station the line runs on a viaduct and crosses two electric tramway routes. All Teign Valley passenger trains stop at the station, where tickets are collected on the up journey.

A short distance south of St. Thomas is City Basin Junction (see diagram). It will be seen that two branches connect to the single line, one from the Alphington Road Goods Depôt and the other from the Exeter City Basin Branch, dipping under the main line. Both these connections are of siding character, being worked from a ground frame; no signals are provided. Nearby is a stop board for up goods and mineral trains.

Curving west and rising at 1 in 56 (later 1 in 58) on an embankment the line passes the village of Alphington and, after traversing considerable lengths of cutting, Ide Halt is reached. This was a " station " until 1923, but the buildings are still in use. West of the platform a goods siding, controlled by two ground frames, is provided.

Still rising (at 1 in 58) and passing further cutting and embankment, Perridge Tunnel is encountered, before which is situated a fixed distant signal for Longdown. Shortly after leaving the tunnel, which is 829 yards long, Longdown Station (6 miles from Exeter, St. Davids) the summit of the line is reached. There is a small signal box, of the ground-frame type, and running signals are provided, the box being a block (Electric Train Staff) post, although without crossing facilities. There is only one *stop* signal in the down direction. Formerly there was no signal box, and the staff section was from City Basin Junction to Christow. There is a short goods siding controlled by the signal box, and at the western end by a ground frame as at Ide. On either side of the station are stop boards for goods and mineral trains about to descend the gradients concerned. Shortly after the station is Culver Tunnel (251 yards), at the western end of which is the up fixed distant signal for Longdown; the down grade from Longdown continues to Christow where the line is within a few feet of the natural ground level of the Teign Valley.

Christow is an important station, and is the only one on the branch where two passenger trains may cross each other. There is a large traffic in road stone, the quarries being about ¾ mile west of the station. From them an aerial rope-



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way runs to the station, where the stone is dropped into wagons below.

The ropeway and sidings for it (on the down side of the railway) were not constructed till after the opening of the Exeter Railway. There is also a private railway for mineral traffic running nearly as far as the ropeway, and crossing the public road near Christow on the level (with gates provided) to make connection with the station sidings. A small 0-4-0T has been seen at work on the line. The siding at the south end of the station was constructed in 1924. The down stop board for goods trains " to pick up brakes " is at the south end of the down platform, which passengers reach by a foot-crossing, although there is a road overbridge nearby.

Running on a low embankment for 1½ miles Ashton is reached. North of the platform is a level-crossing, protected in each direction by distant signals, which are worked from a ground frame. Two other ground frames control siding connections from the main line. There is a water-tank here, and engines shunting at Christow sometimes run light to Ashton and back for the purpose of taking water.

After passing the Trusham distant signal Whetcombe Siding is passed on the left, giving access to a neighbouring quarry; the main-line connection is controlled from a ground frame. Trusham has only one platform and formerly there were no signals, but ground-frame connections only; there was also a signal box similar to that still existing (1927) at Chudleigh. The goods loop, &c., were subsequently provided, with a new signal box, and signals and Electric Train Staff instruments. Shortly after the end of the loop is Crockham Siding (controlled by a ground frame) leading to further quarries. One line crosses the public road (where no gates are provided), and the writer has seen a travelling rail-crane used as a locomotive on these sidings.

Chudleigh Station consists of a short platform, with buildings and a siding controlled by two ground frames. There is also a disused signal box of characteristic design.

After finally crossing the River Teign, Chudleigh Knighton level crossing and halt are passed. The level crossing has no fixed signals. The halt was opened in June, 1924. Continuing through a slight cutting and passing Bovey Lane Crossing also without signals, the line curves sharply into Heathfield Station, where a bay is provided for Teign Valley trains; a through junction with the single-line Moretonhampstead Branch was made about ten years ago. Through working previous to this connection was described in the RAILWAY MAGAZINE, Vol. 54, p. 410 (May, 1924).

At the time of writing a loop has just been completed, but it will be seen that even now Teign Valley-Newton Abbot and Newton Abbot-Teign Valley through trains cannot cross each other without reversal.

It may be mentioned that Heathfield and Bovey Tracey are the only crossing stations on the Moretonhampstead Branch; Moretonhampstead is a block post. " Down " Teign Valley trains become " up " Moretonhampstead Branch trains and *vice versa* when running through on the latter line between Heathfield and Newton Abbot.

Standard Great Western Railway semaphore signals are used throughout the Teign Valley branch. All distant signals, except those for Ashton Crossing, are fixed at danger, and the City Basin Junction down main distant signals cannot be pulled off for Teign Valley trains. Independent ground disc signals are provided where there are signal boxes, except at Longdown; elsewhere nothing more than point discs (worked off point rods) are provided. The single lines are worked by the Electric Train Staff, which also unlocks the ground frames (except, of course, Ashton Crossing ground frame). The usual pick-up and set-down posts are provided at City Basin Junction but not elsewhere. Except at Longdown, where they are in the stationmaster's office, the Electric Train staff instruments are in the signal boxes.

### TRAIN SERVICES AND WORKING.

Most passenger trains run from Exeter, St. Davids, to Heathfield and back, stopping at all stations and halts. Christow is sometimes used as a terminal point for trains from and to Heathfield; and Trusham for a late train from and to Exeter on Saturdays. In the summer of 1922 there were three ordinary trains each way (four on Saturdays), and a rail motor

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HEATHFIELD STATION.

from Exeter to Heathfield and back, and Heathfield to Christow and back; Christow was twice used to cross passenger trains during the day. From the time table a year later, two rail motors were at work on Wednesdays and Saturdays. In October, 1923, the service was worked by rail motors and auto-trains only, but in July, 1927, there was an ordinary train from Newton Abbot to Exeter *via* Heathfield and back in addition. Sometimes there has been a through rail motor to Newton Abbot. The summer, 1927, service consists of six rail motors each way (and an additional one on Saturdays) and the ordinary train just mentioned; crossing places (between passenger trains) are:—Christow (three times), Exeter (twice, three times on Saturdays), Heathfield (once, up through train and down rail motor, terminating at Heathfield). There is considerable mineral traffic in broken roadstone, &c.

Ordinary trains before October, 1923, were usually worked by 0-4-2T's, and goods and mineral trains mostly by 0-6-0 pannier tank engines, but later a 45XX 2-6-2T has also been seen at work. Passenger stock and engines also worked over the Exe Valley Branch. In October, 1923, the passenger service on the Exe Valley line was worked by auto and motor trains only, and these trains have at times worked on the main line to stations not beyond Tiverton Junction and Teignmouth. Stock was to some extent common to both the Exe Valley and Teign Valley Branches, but after September, 1925, rail motors only, not auto-trains, were noted on Teign Valley services. This arrangement has since then generally applied ; the only runs made by the rail motors off the Teign Valley line are to Tiverton Junction, Hele and Bradninch, and from Heathfield to Bovey Tracey, Bovey Tracey to Newton Abbot, returning thence to Heathfield and the Teign Valley line.



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# The Kettle Valley Railway.

By SIR CHARLES PIERS, Bart.

FOR years we had heard of the engineering wonders and scenic beauty of the Kettle Valley Railway, but had never had an opportunity of travelling through the Coast Range by that interesting route, and it was not until the spring of 1927 that, being in Penticton, we were, by the kindness of the Canadian Pacific Railway officials, enabled to return that way to Vancouver.

We had motored from Vancouver with some friends who were returning to Calgary. We had passed through the Coast Range by the usual route up the Fraser River Canyon, where a fine motor road, running above the C.P.R. and the C.N.R. (Canadian National Railways) tracks, has just been constructed. The direct motor route to the interior is incomplete, and until the section through the Thompson Canyon, to Spences Bridge in the Dry Belt is finished, connection with the famous Cariboo Road to the north, and with the roads to the fruit-growing districts of the Okanagan Valley, can only be made by a long detour of 150 miles through the little town of Lillooet and Marble Canyon, when the Cariboo Road is reached.

After running down the Cariboo Road to within twelve miles of Ashcroft we turned off north-east to the railway junction of Kamloops, and then went south to Vernon, the centre of the fruit-growing district of the Okanagan. From there next day we ran along the shores of Long Lake and Okanagan Lake to Penticton, at the south end of the Okanagan Lake. We had covered 500 miles in our round-about motor route, while the distance by rail from Penticton to Vancouver is only 251 miles. At Penticton on the following morning we said good-bye to our friends, who returned to Calgary *via* Nelson and the Banff-Windermere Highway, while we returned to Vancouver over the Kettle Valley Railway, at 11 a.m., by the "Coast Kootenay Limited" from Nelson, where connection is made with the train from Calgary, over the Crow's Nest Pass route, by steamer, from Kootenay Landing, on Kootenay Lake.

At Penticton the railway connects with the steamer service on Okanagan Lake, the C.P.R. stern-wheeler "Sicamous" leaving Penticton daily (Sundays excepted) for Okanagan Landing (Vernon) at 7.15 a.m. There connection is made with the C.P.R. train from Sicamous Junction on the Main Transcontinental Line, the steamer returning to Penticton, which it reaches at 8.45 p.m. the same day. To reach the jetty the railway runs down to the lake shore from South Penticton Station, from where the tracks radiate east, west and south. To the west the line circles the end of the lake, ever climbing upwards, until the summit of the low rounded mountains, bordering the lake, is reached. From there a wonderful view of lake and fruit-orchards is obtained, and quite an aerial view of the town of Penticton, before the train, after passing the fruit district of Summerland, enters a fairly wide valley and turns north-west.

The valley, carpeted with fruit-orchards, narrows after about an hour's run, and when lunch is served in the comfortable Café Parlour Observation Car, the train is steadily climbing up a winding narrow valley through high forest-covered mountains, with a sparkling torrent dashing along beside the track. This gorge, for it is little more, ends at the summit in a gap in the mountains, from which the line descends to a terrain of rolling downs, covered at this season of the year with fine grass, good for sheep-grazing. These rolling downs are covered with clumps of red-trunked pine trees, and in the descent between these downs the train performs some weird contortions, in places almost doubling on itself, so sharp are the curves, until at last it reaches the valley below in which rests the little town of Princeton, quite a railway centre, connection here being made with Copper Mountain to the south. The next point of importance is Brodie, where the line comes in from the



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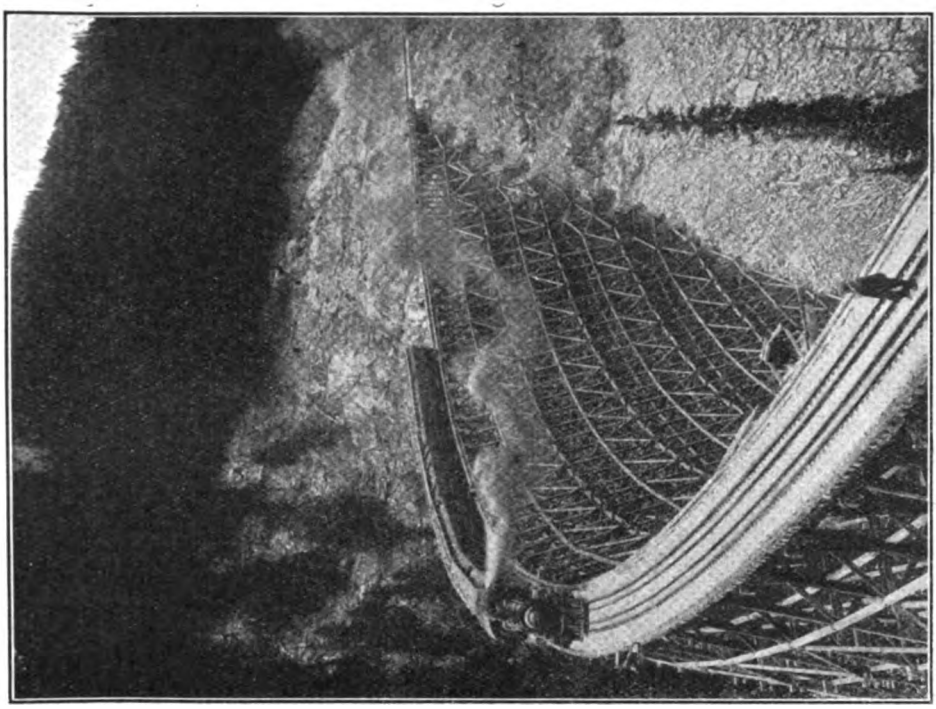
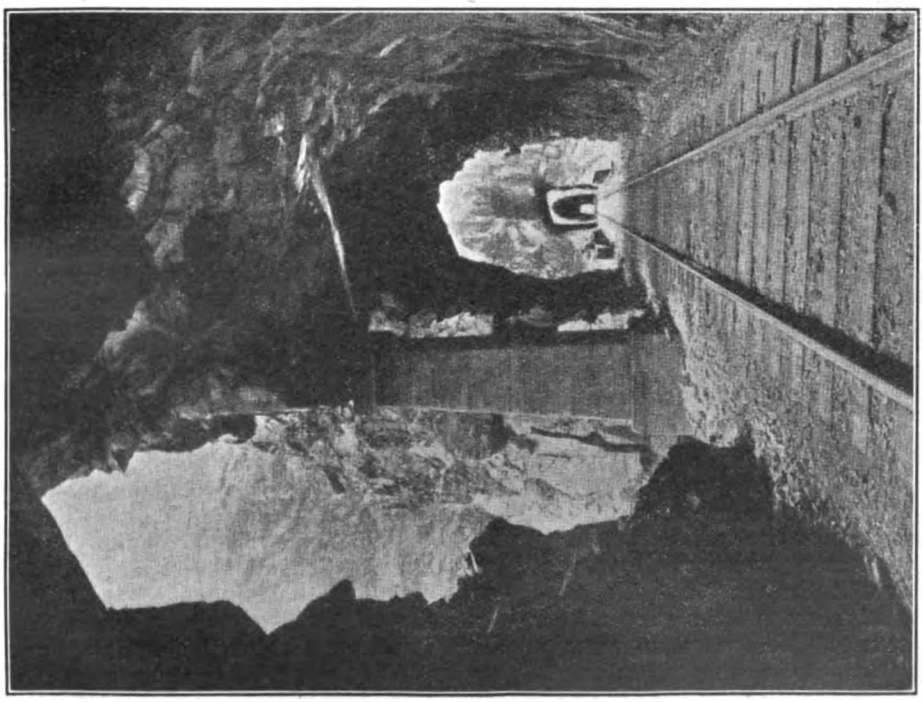


COAST KOOTENAY LIMITED" ON CANYON CREEK TRESTLE, NEAR PENTICTON.



THE QUINTETTE TUNNELS. NEAR HOPE.

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north connecting with Spences Bridge on the C.P.R. Main Line through Merritt, where a branch line runs to the Nicola Valley of cattle-raising fame.

After leaving Brodie the line turns south-west to climb the Coast Range to Hope, and towards 5 p.m. we start climbing along a gradually narrowing valley down which runs eastwards a foaming mountain river. It is a long pull up to the summit of the wonderful pass, or cleft in the towering mountains, through which the railway forces its way, and so narrow is the canyon, deep rent in the mountains, down which foams the Coquihalla River, that there is barely room for both it and the railway, the river literally cutting its way, through or round, huge upstanding rock bluffs, while the train, creeping along a thousand feet or so above, follows the giddy heights of the zigzag track cut from the vertical face of the mountain. The views of snowy slopes above, and sombre forest trees below, through which the river dashes, foaming white, down the gorge, are enthralling, as the train creeps round sharp curves, over long spidery trestles and steel bridges spanning gaping ravines of giddy depth between the mountain spurs. At the summit of the pass (3,220 ft.) the snow still lay thick among the fir trees by the track, and even when we had descended quite a distance, we found the long snow-sheds, protecting the track from snow and rock slides, covered with melting snow, which, pouring through the roof timbers, descended in miniature cascades on the tops of the cars passing beneath. The grade on the western slope is severe, so it is no wonder that the train crawls down, especially when such curves, often over long, high trestles, have to be negotiated. Sitting on the platform of the Observation Car at the rear of the train, the feeling is almost creepy when, after passing through a rock tunnel, the locomotive, with steam shut off and brakes hard on, crawls out on to a long, curving trestle, where the wheels grate and grind as the cars slowly follow round the curving rails, while straight down below in the depths of the gorge the trees and river seem microscopic, such is the distance. The sensation must be somewhat similar to that of walking a tight-rope, or along the narrow top of a twenty foot wall, and some people do not like to look down, as the sides of the platform project over the unguarded sides of the trestling.

Canyon Creek trestle, east of Penticton, where " the railway, in circling the rim of the canyon, forms three loops similar to a maple leaf," has, I believe, thirteen tiers of trestling, and is the largest of these peculiar wooden bridges, about which some people rave. Personally, there is no comparison for gracefulness between them and the gossamer structure of the steel arch bridge spanning a particularly deep ravine, a gigantic cleft in the mountain side, where the track made a sharp in-and-out curve, for though stronger than the wooden trestling it did not appear so, and against the towering massiveness of the mountains looked as if made of spider's webbing, so frail did its span appear compared with the solid-looking tiers of great timbers which make up the structure of the trestle bridges.

Although the grades are heavy, and the curves on the track, high up on the side of the mountains, amazing, our mail train of four or five long cars and a heavy mountain locomotive was as safe as the proverbial mule on a mountain path, and provided the same comfort and sleeping accommodation as the main line Transcontinental trains.

There is no comparison, in my mind, between the scenery it passes through and the Fraser and Thompson Canyons on the main line, the latter being tame compared with the fierce beauty of the Kettle Valley Railway. The wonderful scenery at the western end of the line is situated between Brodie and Hope, and the cream of it is on the western slope of the Coast Range. What it is like between Penticton and Nelson I do not know, but I believe it is very beautiful, and there rises to 4,169 ft. above sea level. Indeed, it must be so to compare with the gems on that last downward run to Hope.

To speak of the slope of the Coast Range at this particular spot hardly conveys a correct impression of the rugged grandeur of the almost vertical mountains that shut in the gorge down which the Kettle Valley Railway descends, together with the tumbling river, from the snow-covered heights above.

Like the good wine in the miracle,

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GIRDER BRIDGE BETWEEN TWO OF THE QUINTETTE TUNNELS

BRIDGE OVER TROUT CREEK GORGE. HEIGHT ABOVE RIVER, 250 FT.

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the best piece of scenery is kept till last, a veritable *bon bouche,* for as we descend almost to the valley level in which lies the railway junction and village of Hope, famous in the days of the "Gold Rush" of the 'sixties, our path is barred by huge castellated cliffs rather than mountains, appearing to deny all exit to the outside world for both railway and river. The phenomenon is heightened by the sudden disappearance of the river, curving round one of the massive buttresses of the barrier in a deep rock cut, a marvellous example of the forces of Nature, and probably the work of ages. The turbulent river forces its way through this narrowest of clefts, scarce visible from a distance, with its constricted waters jumbled and heaped together in a frenzied mass.

As the train swings down to approach the barrier, a tunnel appears into which it plunges, quickly to emerge on to a steel bridge span over the river fuming between vertical rock cliffs, like the stupendous battlements of some ancient castle, of which the tunnels and bridges were the ways of entrance. There are five of these tunnels and intervening bridge spans, and as we flashed in and out of the tunnels and over the bridges someone exclaimed: "The Quintette Tunnels?" Then we realised that we were enjoying the spectacle of one of the most "marvellous feats of engineering on the North American continent, comprising five tunnels, all in perfect alignment. Between each of the five tunnels zigzags the Coquihalla River, spanned by a steel bridge."

From the last tunnel we emerged clear of the mountains into the evening sunshine still lighting the wide valley of the Fraser River, for it was 7 p.m., while alongside foamed the released Coquihalla, rejoicing in its freedom, and sweeping, for the last time, under the railway, formed (to follow the simile) the moat guarding the entrance to the gateway through which passes the road to the mines, fruit-orchards, and ranches of the interior.

At Hope we crossed the long railway and road bridge spanning the Fraser, and shortly after ran on to the Canadian Pacific Railway main line at the foot of the Fraser Canyon, from where a three and a half hours' run, on a fine double track, through the rich farm lands of the delta valley, landed us in Vancouver at 10.30 p.m., after a fitting railway journey to cap such a scenic motor tour.

## BRITISH LOCOMOTIVES IN SERVICE.

We are indebted to Mr. Eric Maxwell for the following analyses of British locomotives, classified according to wheel types, based upon particulars given in the Annual Reports for 1928.

I.—TENDER ENGINES.

| Type. | G.W.R. | L.M.S.R. | L.N.E.R. | S.R. | Total. |
|---|---|---|---|---|---|
| 0-10-0 .. .. | — | 1 | — | — | 1 |
| 2-8-2 .. .. | — | — | 2 | — | 2 |
| 2-8-0 .. .. | 182 | 49 | 462 | — | 693 |
| 0-8-0 .. .. | 1 | 775 | 370 | — | 1,146 |
| 4-6-2 .. .. | — | — | 63 | — | 63 |
| 4-6-0 .. .. | 216 | 889 | 322 | 153 | 1,580 |
| 2-6-0 .. .. | 404 | 124 | 145 | 116 | 789 |
| 0-6-0 .. .. | 317 | 3,506 | 2,178 | 288 | 6,289 |
| 4-4-2 .. .. | — | 23 | 239 | 11 | 273 |
| 4-4-0 .. .. | 315 | 1,158 | 899 | 536 | 2,908 |
| 2-4-0 .. .. | 35 | 166 | 82 | — | 283 |
| 0-4-2 .. .. | — | 22 | — | 99 | 121 |
| 4-2-2 .. .. | — | 1 | — | — | 1 |
| 2-8-0-0-8-2 .. | — | — | 1 | — | 1 |
| 2-6-0-0-6-2 .. | — | 3 | — | — | 3 |
| Totals .. .. | 1,470 | 6,717 | 4,763 | 1,203 | 14,153 |
| Tenders .. | 1,465 | 6,714 | 4,819 | 1,203 | 14,201 |

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II.—Tank Engines.

| Type. | G.W.R. | L.M.S.R. | L.N.E.R. | S.R. | Total. |
|---|---|---|---|---|---|
| 4-8-0 .. .. | — | — | 15 | 4 | 19 |
| 2-8-0 .. .. | 175 | — | — | — | 175 |
| 0-8-0 .. .. | — | 6 | — | — | 6 |
| 0-8-2 .. .. | 6 | 31 | 30 | — | 67 |
| 0-8-4 .. .. | — | 30 | 4 | — | 34 |
| 4-6-4 .. .. | — | 29 | — | 7 | 36 |
| 4-6-2 .. .. | — | 59 | 74 | 7 | 140 |
| 2-6-4 .. .. | — | 27 | 20 | — | 47 |
| 2-6-2 .. .. | 290 | — | — | 4 | 294 |
| 0-6-0 .. .. | 1,122 | 1,327 | 983 | 158 | 3,590 |
| 0-6-2 .. .. | 521 | 390 | 717 | 144 | 1,772 |
| 0-6-4 .. .. | 3 | 64 | 9 | 5 | 81 |
| 4-4-4 .. .. | 1 | — | 45 | — | 46 |
| 4-4-2 .. .. | 30 | 157 | 163 | 64 | 414 |
| 4-4-0 .. .. | — | 33 | 13 | — | 46 |
| 2-4-2 .. .. | 35 | 495 | 310 | 1 | 841 |
| 2-4-0 .. .. | 113 | 15 | — | 6 | 134 |
| 0-4-0 .. .. | 29 | 113 | 80 | 29 | 251 |
| 0-4-2 .. .. | 141 | 22 | 4 | 75 | 242 |
| 0-4-4 .. .. | 4 | 356 | 190 | 359 | 909 |
| 2-2-4 .. .. | — | — | 4 | — | 4 |
| Totals .. | 2,470 | 3,154 | 2,661 | 863 | 9,148 |

III.—General Summary.

| Class. | Met. | Dist. | G.W.R. | L.M.S.R. | L.N.E.R. | S.R. | Total. |
|---|---|---|---|---|---|---|---|
| Tender engines .. .. | — | — | 1,470 | 6,717 | 4,763 | 1,203 | 14,153 |
| Tank engines .. .. .. | 36 | — | 2,470 | 3,154 | 2,661 | 863 | 9,184 |
| Rail motor cars .. .. | — | — | 39 | 32 | 53 | 1 | 125 |
| Electric locomotives .. .. | 20 | 7 | — | — | 13 | — | 40 |
| Electric coaches .. .. | 193 | 272 | 20 | 311 | 87 | 720 | 1,603 |
| Departmental engines .. | 1 | 4 | 5 | 43 | 19 | 8 | 80 |
| Grand total .. .. .. | 250 | 283 | 4,004 | 10,257 | 7,596 | 2,795 | 25,185 |

The July Number will include a

COLOUR PLATE

Showing a G.W.R. Birmingham Two-Hour Express worked by No. 6017 "King Edward IV."

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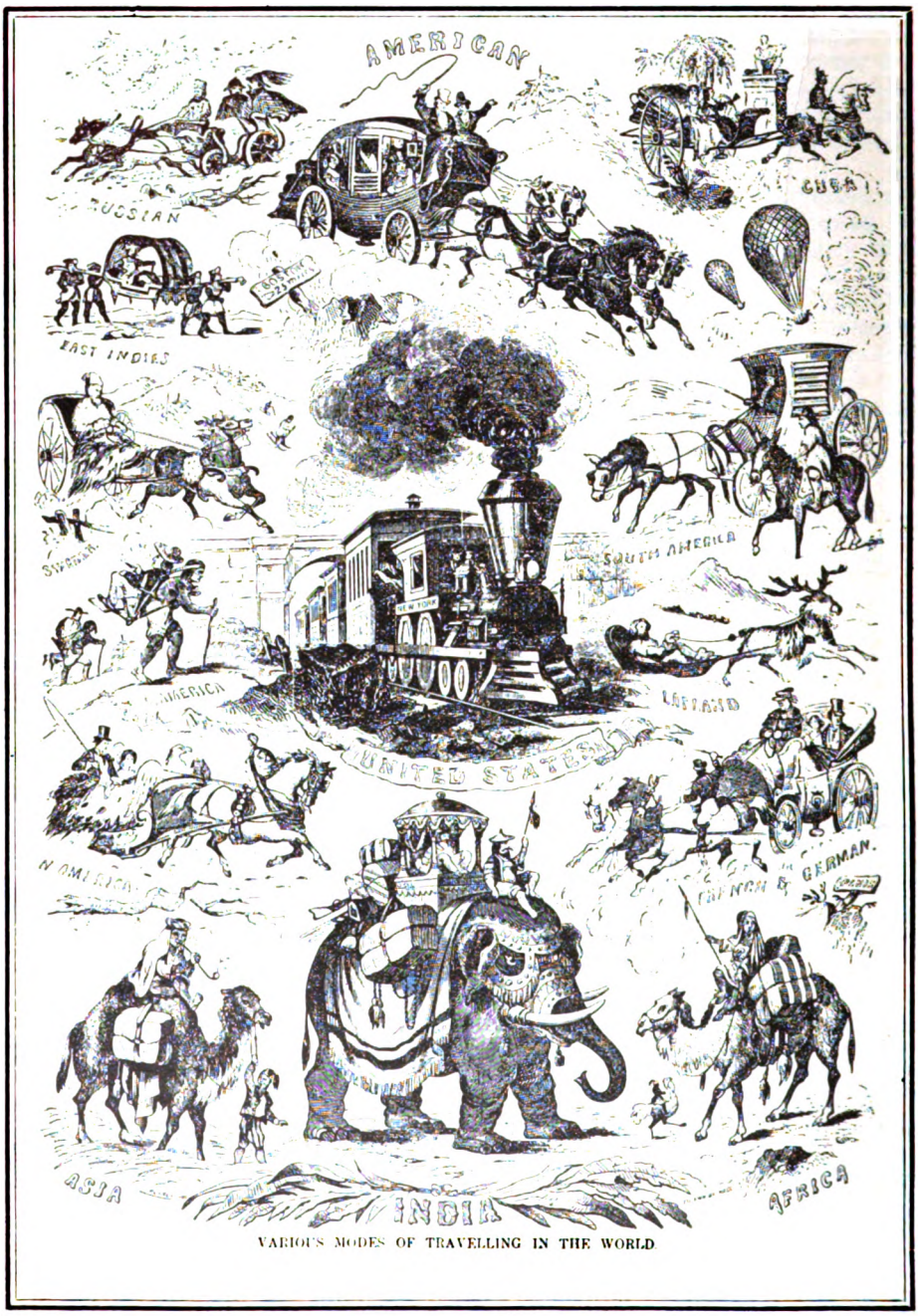


VARIOUS MODES OF TRAVELLING IN THE WORLD

## VARIOUS MODES OF TRAVELLING IN THE WORLD.

**FROM A MAGAZINE PUBLISHED IN BOSTON IN 1855.**

*(By courtesy of "The Pullman News.")*

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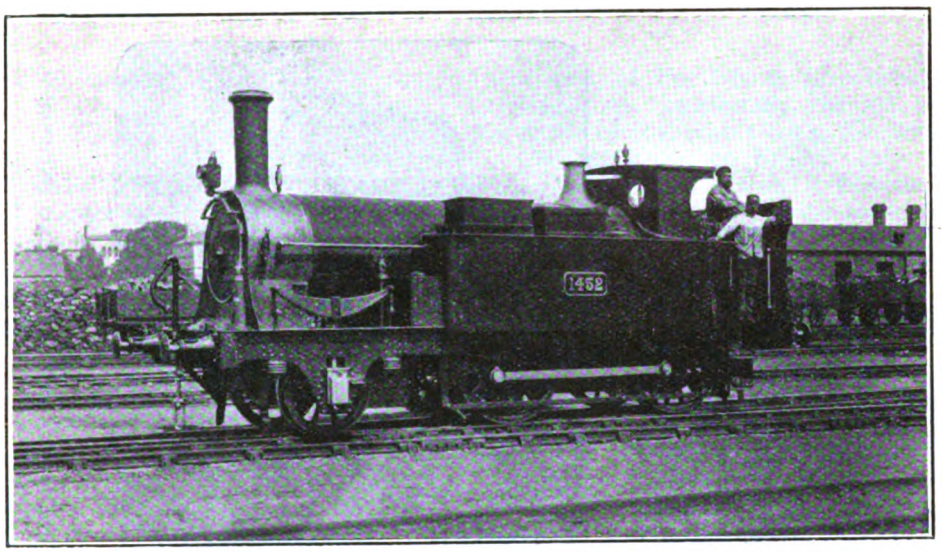


*Photo.*] **2-4-0 TANK ENGINE No. 1452.** [*Loco. Publishing Co. Ltd.*

# Modern Locomotive Practice on the Great Western Railway. [No. XV.]

**By F. W. BREWER, A.I.Loco.E.**

IN the *Great Western Railway Magazine* for May, 1928, there appeared a list of the names of the first twenty 4-6-0's of the new "Saint Martin" series. As these engines are named after Halls, they have been officially designated the "Hall" class, and to this class No. 2925 *Saint Martin*, renumbered 4900, has been added. Including now the latter, which retains its old name, the list referred to is as under:

| No. | | No. | |
|---|---|---|---|
| 4900 | *Saint Martin* | 4911 | *Bowden Hall.* |
| 4901 | *Adderley Hall.* | 4912 | *Berrington Hall.* |
| 4902 | *Aldenham Hall.* | 4913 | *Baglan Hall.* |
| 4903 | *Astley Hall.* | 4914 | *Cranmore Hall.* |
| 4904 | *Binnegar Hall.* | 4915 | *Condover Hall.* |
| 4905 | *Barton Hall.* | 4916 | *Crumlin Hall.* |
| 4906 | *Bradfield Hall.* | 4917 | *Crosswood Hall.* |
| 4907 | *Broughton Hall.* | 4918 | *Dartington Hall.* |
| 4908 | *Broome Hall.* | 4919 | *Donnington Hall* |
| 4909 | *Blakesley Hall.* | 4920 | *Dumbleton Hall.* |
| 4910 | *Blaisdon Hall.* | | |

Several of the new "Halls" have now been completed at Swindon and put into traffic. The first five, Nos. 4901-4905, were built in 1928.

Like No. 4900, *Saint Martin* (formerly No. 2925), which, as already recorded, was provided with 6 ft., in place of 6 ft. 8½ in., coupled wheels, and a cab of the "Castle" pattern, in December, 1924, the new 6 ft. 4-6-0's have two 18½ in. by 30 in. cylinders, 225 lb. pressure, and a tractive effort of 27,275 lb. But, as compared with No. 4900, the engines weigh 75 tons, instead of 72½ tons, and have a total adhesion weight of 56½ tons, as against one of 54 tons 18 cwt., in the case of *Saint Martin*. Slight increases in the engine and tender wheelbase, and in the combined length overall, respectively, have also been effected in the "Halls" proper. Moreover, the boilers of these engines have outside steam-pipes to the cylinders, and are placed higher on the frames than the boiler of No. 4900, their centre lines being 8 ft. 6 in. above rail-level, the corresponding dimension for *Saint Martin* being 8 ft. 1¾ in. when the latter engine was rebuilt in 1924. The increased height of the boilers gives the "Halls" a greatly improved appearance. The tenders hold 3,500 gallons of water, and



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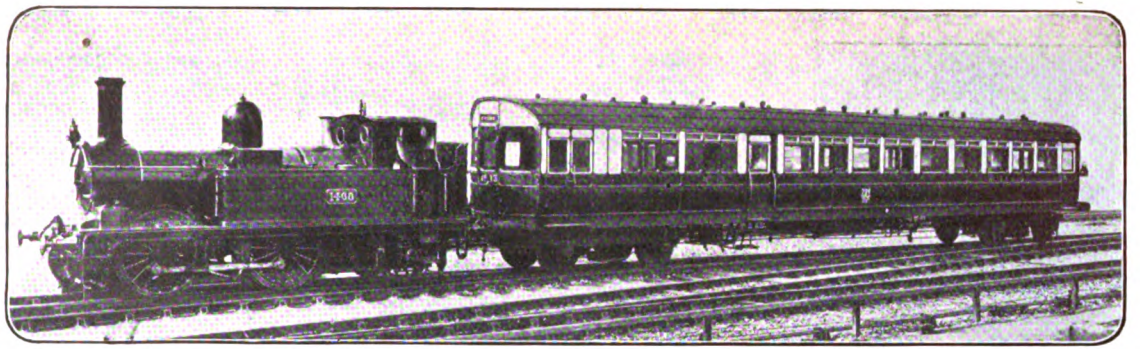

ENGINE AND COACH AUTO-TRAIN COMBINATION.

AUTO-TRAIN LEAVING STOURBRIDGE JUNCTION.
0-6-0T No. 646.
*Photo. Henry L. Salmon.*

RAIL MOTOR No. 85 AND TRAILER WORKING BETWEEN READING AND DIDCOT.
*Photo. Henry L. Salmon.*

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weigh 40 tons full. I may add that the total wheelbase (engine and tender) is 53 ft. 4¾ in., and the length overall 63 ft. 0½ in. The modifications made in the " Halls " are, of course, due to Mr. C. B. Collett. No fewer than eighty examples of this new series are on order at Swindon works at the time of writing.

A correspondent (Mr. G. Templer) has asked me to direct attention to the G.W.R. practice of " off-setting " the cylinders of the outside-connected two-cylinder engines. He refers to the fixing horizontally of these cylinders so that their centre lines are slightly above the centres of the driving and coupled wheels. This method, which is an American one, is, so far as my knowledge goes, confined in this country to the G.W.R. It applies to the great majority of the outside cylinder two-crank engines on this line, irrespective of type or class, there being, according to the official diagrams, some exceptions to it. It was, however, in evidence here before the G.W.R. adopted outside cylinders for their ordinary engines, to wit, in most, if not all, of the various American-built standard gauge locomotives which were imported in 1899-1900 by several of our lines, mention of which has already been made. Two of these railways were the Barry and the Port Talbot, now grouped with the G.W.R., and one or two of their American locomotives (in these particular cases, outside cylinder tank engines) are, or were a short time ago, still at work. The cylinders of all these engines were vertically " off-set." The other " Yankees " alluded to have all long since disappeared.

In regard to the two cylinder 4-6-0's, Mr. H. M. Le Fleming desires me to point out that the valves of No. 2900 *William Dean,* which are inside the frames, are operated by bell-crank levers, while the valves of the other engines, which are on top of the cylinders, are driven by simple transverse rocking shafts of the semi-direct order, having a short downward arm at each end. The bogie of this engine, by the way, has a wheelbase of 7 ft. 2 in. ; that of the bogies of the succeeding 4-6-0's is 7 ft. The total wheelbase of No. 2900 is, therefore, 27 ft. 2 in., as against 27 ft. 1 in. in the others.

The first of the 2-hour Birmingham expresses was, incidentally, hauled by one of the two-cylinder 4-6-0's, No. 2902 *Lady of the Lake,* on Friday, July 1, 1910. This engine carries a horseshoe which someone threw on to the footplate shortly before the train left Paddington at 9.55 a.m. Mr. Churchward afterwards had this emblem of good luck mounted in a suitable frame, and it was then fixed inside the cab of the engine.

A few words may be added with regard to the French compounds. It appears that No. 102 *La France,* when first put into actual traffic working, and while being shunted into the bay on the up side of Bath station, had her trailing wheels derailed at the points. After a short delay she was pulled on the road again by another engine. This mishap was attributed to the tender being too rigidly coupled up to the engine, the pivot of the connecting link being further forward than is the case with the ordinary G.W.R. engines. For this information I am indebted to Mr. L. B. Hewitt.

The two larger " de Glehns," *President* and *Alliance,* Nos. 103 and 104, ran for some time without names and with cast-iron chimneys. In 1914 all the French engines were sent to Oxford sheds.

In the matter of tank engines of the 4-4-2 type with *outside* cylinders, Mr. H. Dixon Hewitt asks me to mention that the former London and South Western Railway was at one time a large user of such engines, all of which were designed by Mr. Wm. Adams. That is so, but there are now only two of these 4-4-2T's at work, and both are on the duplicate list and down for scrapping, the class being virtually obsolete. Seventy-one engines of this Adams type were built by various firms from 1882 down to 1885. Moreover, between 1883 and 1886, twelve 4-4-0T's were converted to the 4-4-2 kind, making a total of 83. I am sorry that I omitted to refer to these engines in my December instalment.

This series of articles would not be complete without some reference to the steam motor coaches and auto-trains of the Great Western Railway.

In this connection, it will be necessary to make a short dip into history. The idea of employing combined locomotives and carriages for light traffic in this

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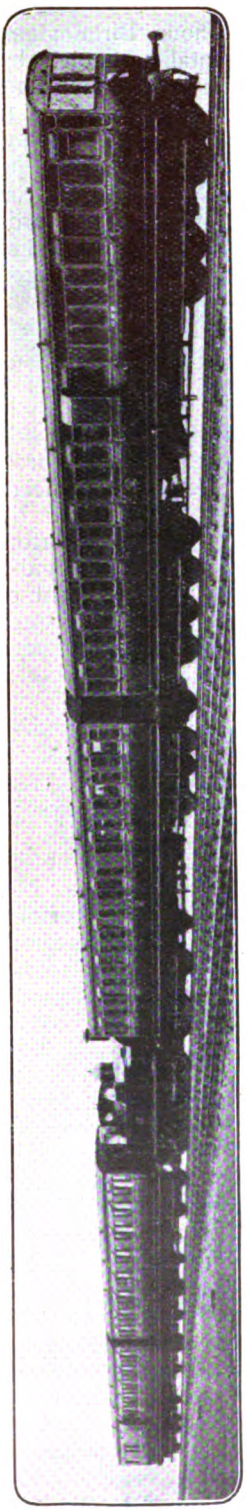

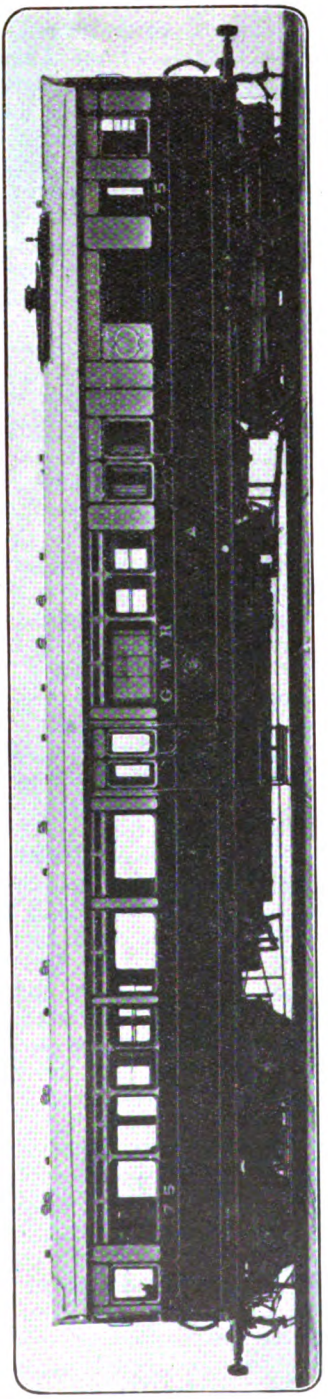

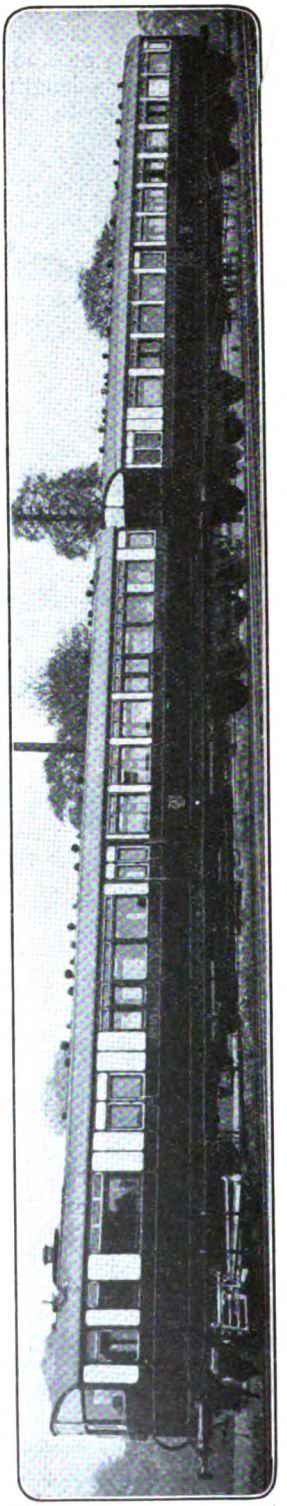

FOUR-COACH AUTO SET WITH ENGINE IN CENTRE.

STEAM RAIL MOTOR.

STEAM RAIL MOTOR WITH TRAILER.

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country originated with Mr. W. Bridges Adams, who took out a patent for a special design of these units in 1846, but the same idea occurred also to Mr. Samuel, the locomotive superintendent of the Eastern Counties (afterwards Great Eastern) Railway, and it was Mr. Samuel who, in 1847, built the first steam rail coach. Adams followed in 1848 with a combined engine and carriage which he constructed for the Tiverton branch of the old Bristol and Exeter Railway, and he also supplied two other and more powerful steam carriages for the Eastern Counties line in 1849. The B. & E.R. unit was named *Fairfield,* and the two E.C.R. coaches were called, respectively, *Enfield* and *Cambridge.* The latter differed from the others in having a separate engine, and Adams subsequently devoted himself to the construction of light independent locomotives, some of which were used for hauling railway inspection saloons, a practice that has survived, here and there, with other engines, down to the present time. But, for ordinary traffic purposes, the combination unit and its variant, the light locomotive (the latter excepted, in the case of light railways, of course), became virtually obsolete in England, although it is to be noted that one or two combined tank engines and coaches were put into use on the G.S. & W.R. of Ireland, about 1875, by Mr. Alex. McDonnell.

In principle, Adams' project was revived by Mr. Dugald Drummond in 1903. in which year he designed and built, at Nine Elms, a steam motor carriage for the joint use of the L. and S.W. and L.B. and S.C. Railways. A second and similar coach was turned out, and both of these vehicles were employed between Fratton and Havant. One of them was tried experimentally on the G.W.R. in the earlier months of 1903, with the result, apparently, that the G.W.R. Company decided to adopt steam coaches of their own design, and the first of such units was put into service between Chalford and Stonehouse, a distance of seven miles, on October 12, 1903. This coach measured 57 ft. 0¾ in. over mouldings, and the motor portion consisted of a pair of horizontal outside cylinders, 12 in. by 16 in., four-coupled wheels, 3 ft. 8 in. in diameter, and a vertical boiler, 9 ft. 6 in. in height, the boiler being enclosed within the carriage body. The total heating surface of the boiler was 669.52 sq. ft., the grate area 11.48 sq. ft., and the working pressure 180 lb. per sq. in. The valve-gear, by the way, was of the Walschaerts' type, and this little motor was probably the first G.W.R. engine proper to be fitted with this motion.

Two improved designs of rail motor carriages were next adopted, one for suburban and one for branch traffic. These, in turn, were constructed in two sizes for each class of traffic, viz., 59 ft. 6 in. and 70 ft. over mouldings, respectively. Down to 1908, the G.W.R. had 99 steam coaches of their own design, together with a large number of trailers. The cylinder and boiler dimensions of the motor engines remained unchanged, but the heating surface differed to a small extent (according to the number of tubes), and the steam pressure was reduced to 160 lb. Some of the earlier 59 ft. 6 in. suburban steam vehicles had 3 ft. 6½ in. coupled wheels ; in later examples, however, the diameter of the driving wheels was 4 ft., for both suburban and branch-line coaches. The feed water, 450 gallons, was carried in tanks fixed underneath the coaches. Coal, to the amount of 30 cwt., was contained in bunkers in the motor compartments.

At the time of writing, 39 steam rail motors, all of the branch type, were in service, comprising nine built in 1905, sixteen constructed in 1906, eight in 1907, and six in 1908.

The company also had, in 1908, a Port Talbot Railway car, but this was sold in 1920. Further, in 1911, they purchased a petrol-engined coach, making a total, at that time, of 101 self-propelled vehicles. One of the steam-driven carriages was destroyed by fire in 1916, three others (in addition to the Port Talbot car) were sold in 1920, and another was condemned in 1927. Of the remainder, 55 were converted to trailers between 1915 and 1927 (13 in the latter year). The petrol car was disposed of in 1919.

I might add that the " 59-ft." motor carriages weighed 38 tons 16 cwt., and the " 70-ft." ones from 43 tons 3 cwt. to 45 tons 11 cwt. when loaded.

During the period in question auto-

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trains were also introduced on the G.W.R. These were hauled by tank engines of the 0-4-2 and other types, and if consisting of two or more carriages the engine was usually placed in the middle, and the controlling gear was so arranged that the trains could be operated from either end. In some cases an engine and a single coach were employed.

The tank engines adapted for G.W.R. auto-train working at the present time consist of 70 0-4-2's, 14 2-4-0's, nine 0-6-2's, and 29 0-6-0's, a total of 122.

Since the above notes were written, however, Mr. Collett has informed me that 13 rail motor cars were converted to trailers last year, and that 12 60-ft. branch type trailer cars were also constructed in 1928.

From 1903 to 1910 several other railway companies employed steam motor coaches (and in some cases auto-trains) for dealing with light and short-distance traffic. This practice, which fell off to some extent in subsequent years, has been recently again revived on certain lines, owing chiefly to the intensification of road competition, and it is hoped that, by the running of special types of small locomotives and steam cars, some portion of the lost traffic may be regained.

Several correspondents have expressed a wish that I would deal with the 2-4-0 side-tank passenger engines other than those already mentioned, and also with the 0-4-2 tank engines. I have pleasure in now complying with their request. I cannot, however, undertake to cite all of the alterations—often of a minor character—which have been effected in the different engines from time to time, and I must, therefore, confine myself to the more important changes which have taken place.

While the design of the first G.W.R. tank engines of the 2-4-0 type was due to Mr. Joseph Armstrong, at Swindon, that of the engines of the 0-4-2 order has been attributed to his brother, Mr. George Armstrong, at Wolverhampton. It is to be noted that Mr. William Dean was also at Wolverhampton for some years, and remained there until 1877, when, after the death of Mr. Joseph Armstrong (on June 5 of that year), he went to Swindon as the latter's successor, the Wolverhampton Works being then in charge of Mr. George Armstrong, but under the general superintendence of Mr. Dean, as supreme locomotive chief of the whole system, both broad and narrow gauge. Consequently, the construction of the 2-4-0's after 1877 was continued at Swindon by Mr. Dean, and that of the ordinary 0-4-2's by Mr. G. Armstrong at Wolverhampton. Mr. Dean did, however, build at Swindon twenty standard gauge 0-4-2T's of a kind different from that of the others, further reference to which will be made later.

The "Metropolitan" 2-4-0's have already been described. Only a certain number of these had condensing gear, and there were, besides, thirty non-condensing tank engines of an otherwise equivalent class. But before dealing with the last-mentioned series, it will be necessary for me to say something about an odd 2-4-0T, which, having been, I understand, the only one of its particular class (it is now scrapped) is, or was, of more than passing interest. This engine, "No. 1," was turned out at Swindon in May, 1880—manifestly to the designs of Mr. W. Dean. It was of the side-tank variety, and had a domed boiler, a cab, and outside frames and bearings for all wheels, with underhung springs. The side sheets of the tanks and those of the cab were in one piece; the cylinders were 17 in. by 26 in., and the coupled wheels were 5 ft. 8 in. (an unusual size at that period for G.W.R. standard gauge tank engines). The boiler, which had the dome on the back ring, had a barrel length of 11 ft. and a maximum diameter of 4ft. 5 in. According to official information, the total heating surface amounted to no less than 1,400.7 sq. ft., while the grate area was 19.03 sq. ft., and the steam pressure 165 lb. per sq. in., all of which details strike me as having been very remarkable for the year 1880. The tractive power was 14,920 lb.; and the weight of the engine in working order (including 880 gallons of water in the tanks) was 47 tons 12 cwt. The boiler stood fairly high, its centre line being 7 ft. 2 in. above rail-level. Out of a total wheelbase of 17 ft. 6 in., the spread of the four-coupled wheels accounted for 9 ft.—an exceptional length at the time in question.

In 1914, No. 1 was fitted with a Belpaire boiler, having a somewhat larger

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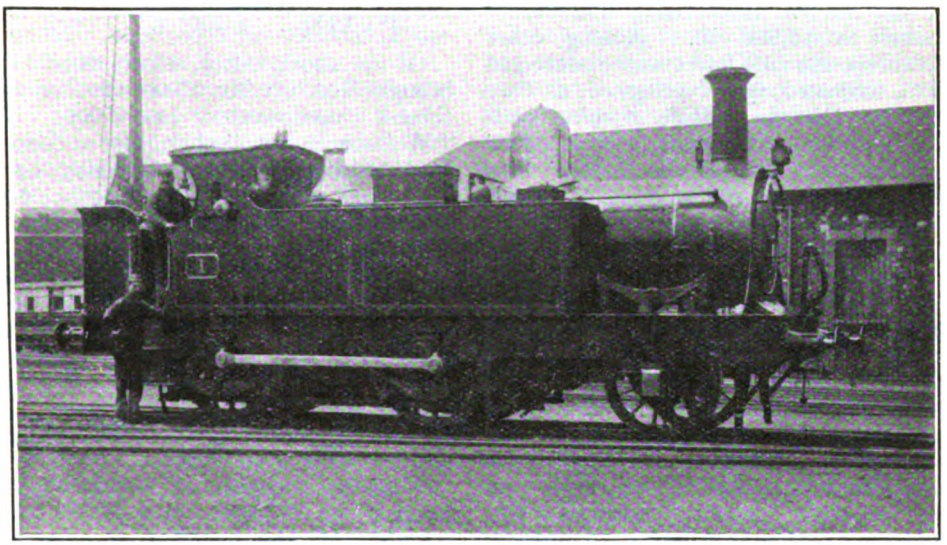
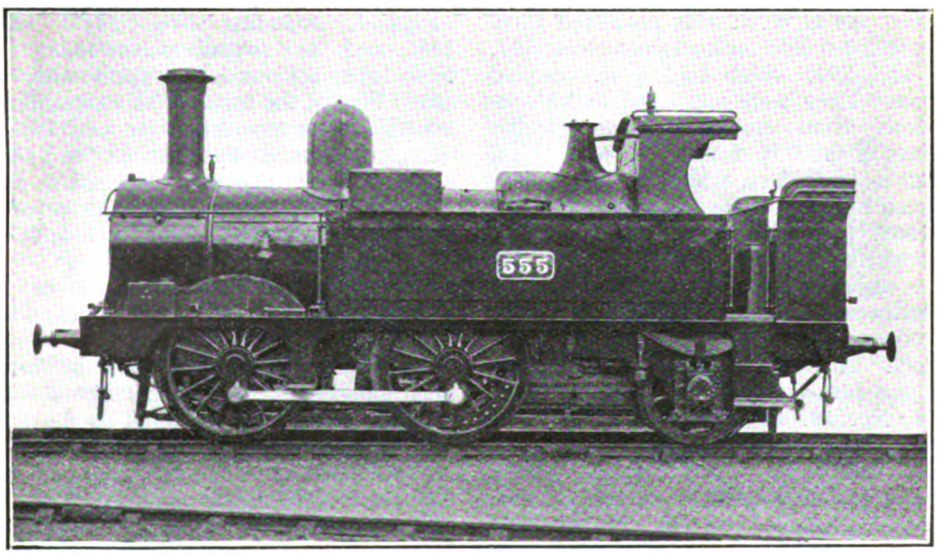


*Photo.*] **2-4-0 TANK ENGINE No. 1.** [*Loco. Publishing Co. Ltd.*




**0-4-2 TANK ENGINE No. 555 WITH EXTENDED SMOKEBOX AND OUTSIDE TRAILING WHEEL BEARINGS.**

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dome than the previous one. This boiler, 11 ft. by 4 ft. 5 in., the size of the previous one, carried a pressure of 180 lb., the tractive force being thereby increased to 16,900 lb. Among other alterations, the side tanks were reduced in width, and no longer overlapped, as they formerly did, the outside running platform, and, furthermore, they were separated from the cab side sheets. The tanks then held 850 gallons, and the weight of the engine, as modified, became 46 tons 18 cwt. A total heating surface of 1,282.74 sq. ft. was provided by the Belpaire boiler, the grate area of which was 17.2 sq. ft. At some time or other, the engine was fitted with overhung springs to the leading wheels; also with boiler top-feed (fixed ahead of the dome); and with a chimney of the latest pattern with *capuchon*. A " solid " coal guard round the top of the bunker, in lieu of rails, constituted another change. This distinctly notable little engine (a photograph of which is reproduced herewith), was broken up in 1924. Mr. J. N. Maskelyne has informed me that she worked in the Chester district, was regarded by the men as a very good engine, and was a fast runner. I might add that in 1881 the G.W.R. also possessed three express 2-4-0 side tank engines, Nos. 197, 199 and 201, which had 6 ft. coupled wheels. They were supposed to be conversions from standard gauge tender engines of the 6 ft. 2-4-0 type, with 16 in. by 20 in. cylinders, which had been constructed by Messrs. Beyer, Peacock & Co. in 1862, for the West Midland Railway (afterwards G.W.R.). As 2-4-0T's, the three engines referred to were, however, virtually new locomotives, and had new cylinders, 17 in. by 24 in., and new boilers. In the " side tank " form, No. 201 was turned out at Wolverhampton in 1879, No. 197 in 1880, and No. 199 in 1881. They ran only a few years in that form, and once again became tender engines, No. 199 being so altered in 1884, No. 197 in 1885, and No. 201 in 1886. The conversion of the original engines to side tanks was carried out at Wolverhampton to the orders of Mr. Wm. Dean, who, however, left the re-designing of the engines to Mr. G. Armstrong.

Taking next the previously-mentioned thirty 2-4-0 non-condensing tank engines, the numbers and dates of these were:—

| *No.* | | *Date.* |
|---|---|---|
| 1445-1464 .. | Swindon | 1881-1882 |
| 1491-1500 .. | Swindon | 1892 |

Of the above thirty, all of which were brought out by Mr. Dean at Swindon, those numbered 1445-1464 had " Wolverhampton " chimneys, and domeless boilers when new. A photograph of No. 1452, showing these features, is reproduced on page 439. From 1881 to 1883, Mr. Dean favoured such boilers for various types of engines, but reverted to domes in 1884, and the twenty 2-4-0T's in question were eventually provided with them when the time came to re-boiler the engines. The 1491-1500 lot always had domes, and all thirty engines had 16 in. by 24 in. cylinders and 5 ft. 0 in. coupled wheels (later 5 ft. 2 in.).

With the exception of two or three of the engines, all, again, were in due course rebuilt with Belpaire fireboxes. These modern boilers had 1,099.54 sq. ft. of heating surface, a grate area of 14.61 sq. ft., and a steam pressure of 165 lb. per sq. in. The tractive force was 13,985 lb., and the weight of the rebuilds was 38¾ tons. Several of the engines have been scrapped, including Nos. 1447, 1449, 1450, and 1451 (withdrawn in 1928), and Nos. 1452, 1458 and 1460 (previously cut up). Five of the former " Metropolitan " 2-4-0T's were also taken out of traffic in 1928, viz., Nos. 6, 469, 620, 627 and 1417; and, in addition to those notified in Part XII as having been broken up prior to 1928, may now be mentioned another, No. 455.

Originally, the leading wheels of the first forty of the Metropolitan tanks had inside bearings, those of the subsequent engines (from 1871) had outside frames and axle-boxes, and from about 1888 external bearings were fitted to the leading wheels of the preceding engines, with the exception, I understand, of No. 461. The front wheelbase of Nos. 3-6, and 455-470, was 7 ft. 3 in., while that of Nos. 613-631, was 7 ft. 6 in., with a coupled wheelbase of 8 ft. In the case of Nos. 632, 967-986, 1401-1420, 3561-3570, 3581-3599 and 3500 (formerly No. 3600), the spread of the coupled wheels was 8 ft. 3 in., and the leading wheels were spaced 7 ft. 9 in. from the driving

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wheels proper. The other engines when rebuilt were given the same front wheel base of 7 ft. 9 in., but the distance between the centres of the driving and trailing wheels remained 8 ft. Several of the 2-4-0T's now work auto-trains.

I may mention here that No. 3593, the 2-4-0T which was converted to a 2-4-2T in 1905, with lengthened frames, an overall cab, and an enlarged bunker, had a total wheelbase of 23 ft., the extra pair of carrying wheels, which were 3 ft. 8 in. in diameter, and had inside bearings, being placed 7 ft. from the rear coupled wheels, centre to centre. Like the other 2-4-0T's which were rebuilt with Belpaire fireboxes, No. 3593 had a total heating surface of 1,099.54 sq. ft., and a grate area of 14.61 sq. ft. The steam pressure was, however, 150 lb., instead of 165 lb. (the more usual figure for the rebuilds), so that the tractive effort was 12,635 lb., instead of 13,895 lb., that of the engines with the higher boiler pressure. As before, the cylinders were 16 in. by 24 in., the four-coupled wheels were 5 ft. 2 in., and the capacity of the tanks was 1,100 gallons. After being altered to the 2-4-2 type, No. 3593 weighed 47¼ tons. She was scrapped in 1927. A photograph taken of this engine whilst she was hauling a local passenger train near Pangbourne was reproduced in the RAILWAY MAGAZINE for June, 1928, page 475. It will be noticed that the leading wheels of the engine are shown fitted with spiral springs. Such springs were provided in the case of the forty "Metropolitan" 2-4-0 tank engines (of which No. 3593 was one) that were rebuilt with extended side-tanks, the latter leaving insufficient room for the long-cambered laminated springs hitherto used.

In 1885, Mr. Wm. Dean turned out at Swindon twenty side tank engines of a special 2-4-0 design (with the leading wheels directly under the smokebox). Ten of these engines, Nos. 3501-3510, were broad gauge convertibles, with inside frames for the coupled wheels, while the other ten, Nos. 3511-3520, were narrow gauge engines, and had outside bearings for all wheels. The cylinders were 17 in. by 26 in., and the driving wheels were 5 ft. 1 in. The standard gauge lot were equipped with condensing apparatus for working through the Severn tunnel. Both batches were afterwards reconstructed as 5 ft. 2 in. 2-4-0 tender engines, and, as such, were dealt with by me in Part II.

I now come to the 0-4-2 tank engines. The standard, or "517" class of these formerly comprised 166 examples (*vide* the accompanying list), of which approximately 140 are still running. All were built at Wolverhampton, and all had coupled wheels, of the nominal diameter of 5 ft. At the present time, those in service differ in various ways, not only from the original designs, but also, in many instances, from each other. It would occupy too much space to capitulate all of these differences as between one engine and another. Some of the 0-4-2T's have been fitted with extended smokeboxes, some with top-feed, others with overall cabs and larger tanks, and the majority with Belpaire fireboxes, and improved coal bunkers. Furthermore, very many of the engines have been adapted to auto-train working.

Referring to the list, fifty-four of the engines, Nos. 517-570, were at first constructed as saddle tank engines in 1868-1870, and were altered to the side-tank class during the years 1876 to 1887. Engine No. 571, built in 1870, was, therefore, the first of the 0-4-2T's to be turned

GREAT WESTERN RAILWAY.

LIST OF 0-4-2 SIDE-TANK PASSENGER ENGINES BUILT AT WOLVERHAMPTON.

| No. | Date. |
|---|---|
| 517-570*† | 1868-1870 |
| 571-576 | 1870 |
| 826-849 | 1873-1875 |
| 1154-1158 | 1875 |
| 1159-1165 | 1876 |
| 202-205 | 1876 |
| 1421-1440‡ | 1877 |
| 1441-1444 | 1878 |
| 1465-1476 | 1883 |
| 1477-1481 | 1884 |
| 1482 | 1885 |
| 1483-1488§ | 1885 |
| 3571-3580§ | 1895-1897 |

* Originally saddle tanks. Converted to side-tank engines, 1876-1887.

† Cylinders 15 in. by 24 in. (afterwards 16 in. by 24 in.) for engines built down to Nos. 202-205.

‡ Built, new, with 16-in. cylinders; also subsequent engines.

§ Constructed with outside bearings to trailing wheels.

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out new with side tanks, and it was, consequently, the actual pioneer of the class. These earlier engines, and the examples built down to 1876, had 15 in. by 24 in. cylinders; but in the case of the subsequent engines a diameter of 16 in. was adopted, and cylinders of this larger size began to be fitted to the 15 in. series from about 1880. Sixteen of the 0-4-2's, Nos. 1483-1488 and 3571-3580, differed from the others, as originally constructed, in having outside bearings to the trailing wheels, but the rear wheels of a large number of the older engines were in due course also provided with such bearings. The driving wheels were 5 ft. 2 in. in diameter when furnished with modern tyres. The diameter of the carrying wheels was similarly increased from 3 ft. 6 in. to 3 ft. 8 in. Bell-topped chimneys were fitted to the 1870-1876 batches, but most of the later engines had chimneys of the Wolverhampton pattern. Some of the older 0-4-2's were rebuilt at Wolverhampton, and others at Swindon, but the respective rebuilds at these two works were not necessarily alike in all respects.

The old boilers carried a pressure of 140 lb.; they had raised firebox casings, and varied in diameter from 3 ft. 6 in. to 3 ft. 8 in. The heating surface also differed in several of the engines, the number of tubes not being always the same.

There were, further, differences in the wheelbase, that of the various early series ranging from 13 ft. 7 in. to 14 ft. 8 in. In the later engines, those built after 1876, it was 15 ft.; the latter figure was subsequently increased in a large number of cases to 15 ft. 6 in., and this has since become the more usual wheelbase for the 0-4-2T's. The coupled wheelbase has always been 7 ft. 4 in., hence the distance between the rear pair of those wheels and the trailing carrying wheels has been lengthened to 8 ft. 2 in., in the engines having a total wheelbase of 15 ft. 6 in.

The domed Belpaire boilers now fitted to the engines have the following dimensions: Maximum diameter outside, 3 ft. 10 in.; length of barrel, 10 ft.; height of centre from rails, 6 ft. 7 in.; total heating surface, 987.61 sq. ft.; grate area, 12.83 sq. ft.; steam pressure, 150 lb. per sq. in. With a tank capacity of 620 gallons of water, the engines having these boilers weigh 35 tons 4 cwt. In a number of instances the tanks have, however, been enlarged to hold 900 gallons.

One of the 0-4-2T's, No. 1421, which was withdrawn from traffic in 1928, was rebuilt in 1922, with 16½ in. by 24 in. cylinders, and with a non-domed parallel Belpaire boiler. This boiler, 3 ft. 10 in. in diameter by 10 ft. in length, had a total heating surface of 908.93 sq. ft., a grate area of 14.70 sq. ft., and a working pressure of 165 lb. The engine weighed 38 tons 18 cwt., and had a 900-gallons tank capacity. After being rebuilt, No. 1421 was employed in running the rail motor service between Cardiff and Rhydyfelin. It has now been broken up.

Perhaps the most interesting of all the 0-4-2T's is No. 1473, which bears the name of *Fair Rosamund*. This engine has for a great many years belonged to the Kidlington-Woodstock branch. It is now fitted with an overall cab (having previously been rebuilt with a Belpaire firebox), and works a " trailer " on that branch as an auto-train. The name of No. 1473 is an historical one, and its origin is well worth recalling. " Fair " Rosamond, a daughter of Walter Clifford, a baron of Herefordshire, became mistress to Henry II, and was kept concealed by the king in a bower surrounded by a maze, or labyrinth, in Woodstock Park. This rendezvous, now known as " Fair Rosamond's Bower," was rendered secure against casual or unauthorised intrusion by means of a secret thread, as described in the following quaint lines:—

" Most curiously that bower was built,
Of stone and timber strong
An hundred and fifty doors
Did to this bower belong.
And they so cunningly contrived,
With turns around about,
That none without a clue of thread
Could enter in or out."

Legend has it that Queen Eleanor, the wife of Henry II, succeeded in discovering the secret of access to the bower, whereupon she visited her rival and promptly poisoned her, in the year 1173. Hume, in his *History of England*, asserts that " The celebrated story of the labyrinth and of the tragic fate of Rosamond, is an invention of later times." That

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Rosamond was mistress to Henry II, and bore him two sons, are, however, historical facts. She was buried in Godstow Nunnery, where she had been educated. On the engine the name is spelt " Rosamund."

The 0-4-2T's were to be found on most parts of the G.W.R. system, and in their day they have certainly done very useful work. The majority of them are still in service, but fourteen were broken up in 1928, viz., Nos. 202, 222, 518, 527, 544, 545, 546, 572, 826, 1421, 1422, 1434, 1437 and 3572. Several were taken out of traffic prior to 1928, these including Nos. 204, 520, 552, 560, 567, 573, 843 and 1480.

The standard gauge 0-4-2 tank engines which, as before mentioned, were turned out at Swindon to Mr. Dean's designs, and which were of another class altogether, were numbered 3521-3540. They were built in 1887-1888, with long side tanks, 17 in. by 24 in. cylinders, 5 ft. 1 in. coupled wheels, and outside frames for all wheels. Three of these engines, Nos. 3521, 3522 and 3523, were provided with condensing gear for Metropolitan service, and for a short time worked in the London area. They were afterwards fitted with much shorter side tanks, and with trailing Mansell-wheel bogies having external bearings, the engines thus becoming 0-4-4's. Nineteen broad gauge " convertible " inside-framed saddle tanks, Nos. 3541-3559, which were constructed at Swindon by Mr. Dean in 1888-1889, were also altered the 0-4-4 side tank type, seventeen as broad gauge, and two, Nos. 3543 and 3547, as narrow gauge engines (1890-1891). Of the broad gauge lot, No. 3560 had been turned out as a 0-4-4, with short tanks at first.

The 7 ft. gauge 0-4-4T's were eventually, of course, adapted to the standard gauge, but all forty engines (Nos. 3521-3560) were finally reconstructed as 4-4-0 tender locomotives, between 1892 and 1902. Particulars of the latter were given in Part II (March, 1928).

In 1928 five of these 5 ft. 2 in. 4-4-0's were withdrawn for scrapping, their numbers being 3535, 3537, 3543, 3549, and 3553. I might add here that another of the 5 ft. 2 in. 2-4-0 tender engines (formerly tank engines), No. 3510, was also cut up in 1928.

(*To be continued.*)

## AN ANGLICISED AMERICAN LOCOMOTIVE.

(*See illustrations on page* 450.)

Reference was made recently to the 4-6-2 type locomotive *President Cleveland,* of the Baltimore and Ohio Railroad, the design of which was fashioned to some extent on that of the *King George V* locomotive which the Great Western Railway sent to the Centenary Exhibition of the Baltimore and Ohio Railroad in the autumn of 1927.

The very favourable impression created upon locomotive engineers and others in America by the *King George V* is further reflected in some additional remodelling of United States locomotives, and by the courtesy of the Editor of the *Great Western Railway Magazine* we are enabled to reproduce herewith two photographs showing a 4-4-0 type engine belonging to the Delaware and Hudson Railway Company, before and after rebuilding.

The Superintendent of Motive Power, Mr. G. Edmonds, has taken in hand the transformation of one of the classes of passenger engines on that line, and the photographs show that he has effected what amounts almost to a metamorphosis of the appearance of the engine as a whole.

As rebuilt, with new-style chimney, steam dome, and " clean " external appearance of the boiler, etc., with cab removed to a normal position, the class presents a much neater and better-proportioned appearance, and the congratulations which are undoubtedly due to the Great Western Railway should also be extended to Mr. Edmonds for having, as a consequence of his inspection of the *King George V,* made such a noteworthy and beneficial change in the appearance of his engine.

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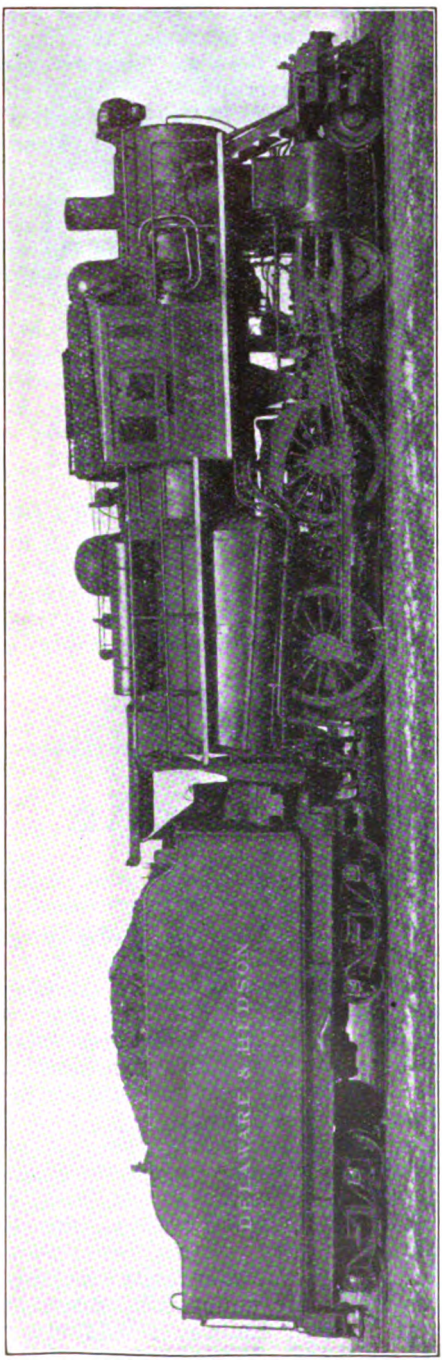
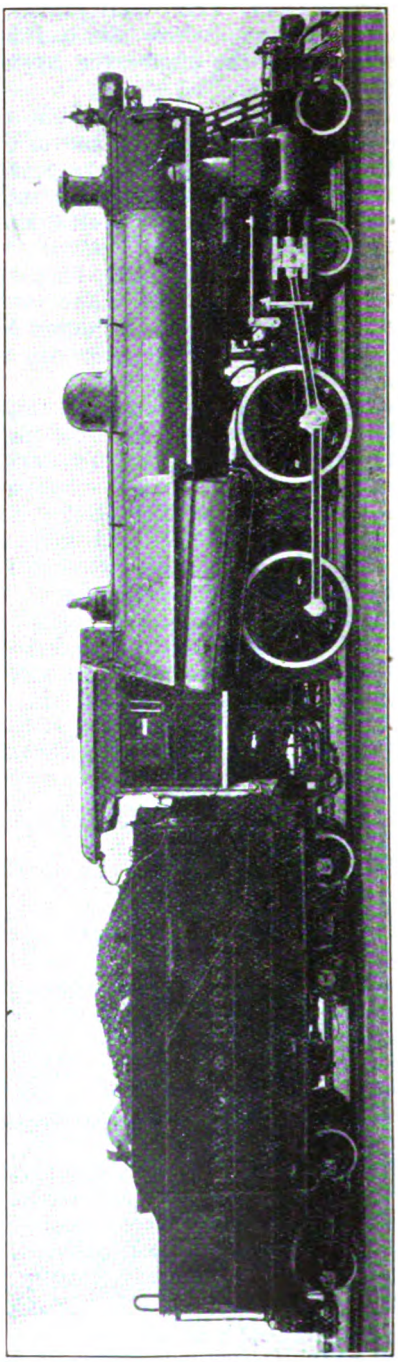



DELAWARE AND HUDSON 4-4-0 TYPE AS ORIGINALLY BUILT.



THE SAME CLASS OF ENGINE AS REMODELLED ON G.W.R. "KING GEORGE V" LINES.

(*See Article on previous page.*)

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# British Locomotive Practice and Performance.

By CECIL J. ALLEN, M.Inst.T., A.I.Loco.E.

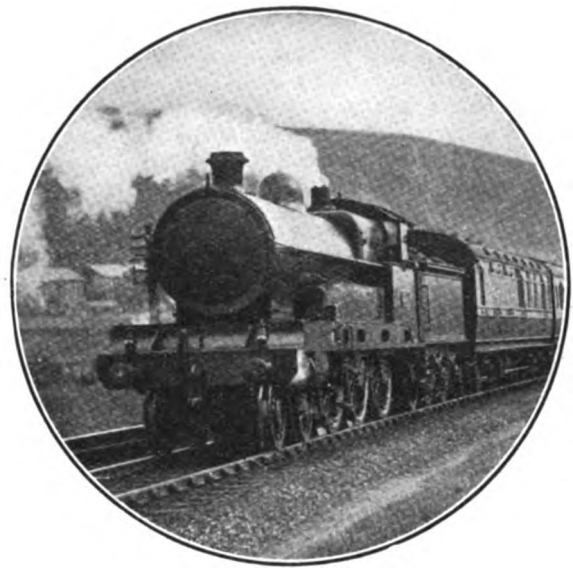

*Photo.*] [*H. Gordon Tidey.*

DOWN L.M.S.R. EXPRESS PASSING TEBAY.
Claughton Class 4-6-0 No. 5009, *Princess Helena.*

IN a recent issue of the *Nottingham Guardian* I read some references to the information purveyed by our daily newspapers concerning the railways, which ought, I think, to command the cordial agreement of all those who possess a real acquaintance with railway facts. "Even a harsh critic of the newspaper Press," the paragraphs began, "would concede that it gets its facts right in quite a remarkably high percentage of instances, though its subjects range over the whole field of human knowledge. But there is one curious exception, and that is the perfectly commonplace department of railway operation. Great newspapers, and popular newspapers, with few exceptions, are alike fallible in this respect, though why it should be so is an enduring puzzle. The latest instance of erroneous statement on a railway matter crept into several accounts of Major Segrave's extraordinary motor speed on Daytona Beach. With an accuracy extending to several places of decimals, the highest speeds attained by motor craft on land and sea and in the air were tabulated, but the highest railway speed was stated thus: '75 m.p.h. (Flying Scotsman).' If the 'Flying Scotsman,' or any other crack express, did not exceed 75 m.p.h. in places on every day of the week, there would soon be complaints of unpunctuality. In the higher realms of railway speed, 75 m.p.h. is ordinary, 80 m.p.h. occasional, 85 m.p.h. exceptional and 90 m.p.h. rare. The highest authenticated railway speed was reached on the Great Western Railway by a mail special hauled by the *City of Truro,* on May 9, 1904, down the Wellington bank towards Taunton, when the official maximum was 102.4 m.p.h." The writer of this accurately-informed editorial note then proceeded, I may add with all due modesty, to quote from one of my books as his authority on the subject of railway speed generally.

By comparison, I will now reproduce a recent article which occupied a prominent place in the *Daily Mail,* under the heavily-leaded caption "100-MILES-AN-HOUR TRAINS—New Engines Being Made—Special *Daily Mail* News." It ran thus.

"Locomotive designers of the great railway companies are trying to produce engines of greater speed and power.

"It is predicted that the day is not far distant when express trains will rush along at a speed very much nearer 100 miles an hour than they do to-day."

"Already an engine—the *Duke of Connaught*—owned by the Great Western Railway, has travelled at 102 miles an hour with the Atlantic Mails from



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Plymouth, but this is still the exception and not the rule."

"Designers are now working on engines which will have a boiler pressure of 900 lb. to the square inch, instead of the present 220-230 lb. They believe that this will not only give a speedier and more powerful engine, but that it will be more economical in working."

"The German and Swiss railways have already produced engines of this type, and one being built at Glasgow for the L.M.S. Railway, under the direct personal supervision of Sir Henry Fowler, the designer, is nearing completion."

"The Southern Railway at its Eastleigh works is building an engine to burn pulverised coal—another development in engine construction."

"The London and North Eastern Railway has a contract with Messrs. Beardmore for an entirely new type. This is to draw loads up to 1,000 tons, chiefly coal trains."

"It will be a power station on wheels. The Diesel engine, burning crude oil, will generate electricity to provide power to drive the engine. This will not be expected, because of its heavy load, to travel at more than 30 miles an hour."

This article is not to be pilloried as an exceptionally bad example of the misrepresentation of railway facts; on the contrary, it is better informed in some respects than many. But for all that, scarcely one of the paragraphs quoted above is free from error. The first of them states that the aim of present-day British locomotive designers is "to produce engines of greater speed and power." It is not. As these articles commonly indicate, the principal locomotive types in this country, when properly driven, are already more than abreast of maximum traffic demands. The objective of the new high-pressure designs is greater efficiency—a very different thing. We next have the prediction of "100-miles-per-hour travel," or something near it. Who is responsible for this sanguine prophecy we are not told. Over most of our main lines an average overall gait of 60 miles an hour—entailing average speeds on the level of 70, improved uphill work and downhill maxima as at present—is possible with existing express passenger types and is, in fact, long overdue on the fastest services. Only the English Great Western, the French Nord, and the American Philadelphia and Reading and Pennsylvania (on their services between Philadelphia and New York and Philadelphia and Atlantic City, between stops) lines have at present instituted any such standard. But 100 m.p.h. as a ruling speed on the railway is not "predicted" by anyone having any real acquaintance with the subject.

The third paragraph deals with the record Great Western running of 1904, and attributes the highest speed record to the 4-2-2 engine *Duke of Connaught*. This is incorrect. As the *Nottingham Guardian* has already told us, the 4-4-0 locomotive *City of Truro* achieved the speed of 102.4 m.p.h.; the *Duke of Connaught* was attached at Pylle Hill, Bristol, for the journey thence to London. In the fourth paragraph we are correctly given the working pressure of the new high-pressure types as 900 lb. per sq. in.—not *tons*, this time!—but "220-230 lb." is mentioned as being a customary pressure for other types, whereas the number of locomotive types in this country pressed at 220 lb. and over is not more than a round dozen in all. We are next told that the new 900-lb. *Royal Scot*, at present under construction for the L.M.S., is to the designs of Sir Henry Fowler, instead of being, as it is, the German Schmidt-Henschel arrangement, with the necessary modifications to fit the *Royal Scot chassis* and the L.M.S. construction gauge. Similarly, in Germany it was not the enterprise of a German railway but the private firm of Henschel and Sohn, of Cassel, that produced the first 900-lb. design there.

In the next paragraph we hear of the Southern pulverised fuel locomotive, but this is no new development; Mr. J. G. Robinson tried both pulverised fuel and colloidal fuel on the Great Central Railway in 1919. Neither is the Beardmore Diesel-electric system, mentioned in the succeeding paragraph, anything new. Diesel-electric cars have been running on the Canadian National Railways for several years now, followed by the more recent Diesel-electric heavy articulated freight locomotive; and a Diesel-electric train has operated on the L.M.S. system round Blackpool for at least a year.

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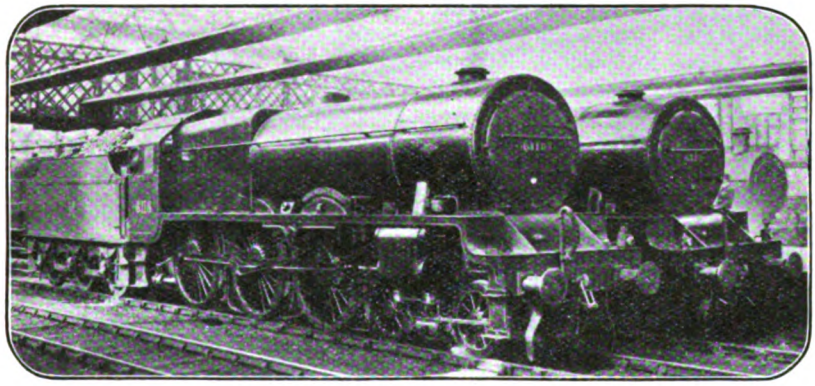

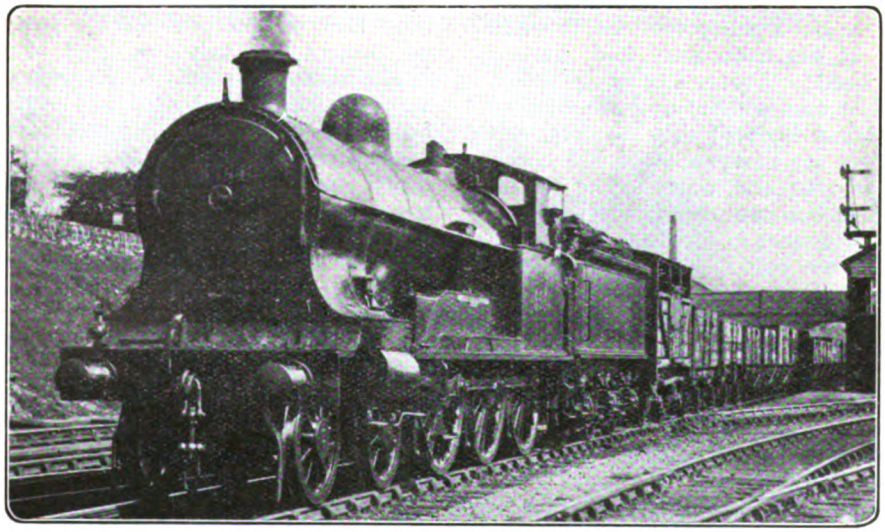

1. DOWN "MIDDAY SCOT." 4-6-0 No. 6112, "SHERWOOD FORESTER." *Photo. H. Gordon Tidey.*

2. "ROYAL SCOTS" No. 6123 "ROYAL IRISH FUSILIER" AND No. 6118 "ROYAL WELCH FUSILIER" AT CARLISLE. *Photo. J. J. Cunningham.*

3. No. 5554 "PROSPERO" ON GOODS TRAIN NEAR COVENTRY. *Photo A. W. Flowers.*

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Even the L.N.E.R. Diesel-electric locomotive is not to be entirely new, for the 0-4-4-0 *chassis* of one of the Shildon-Newport electric freight engines is being utilised for the purpose. So much for railway "facts." The trouble is that many of the public believe that what they see in print must necessarily be true.

In a recent issue of the *Morning Post* there appeared a most thrilling account of the sensations of its "Special Representative" in travelling on the footplate of the engine working the "Golden Arrow" express of the French Nord from Calais to Paris. It was made even more thrilling by the writer's embellishments of the actual facts. For example, the distance from Calais to Paris is a shade over 184 miles; it was given, both in the headline and in the text, as 187 miles, and as the time occupied was 185 min., this sufficed to raise the average speed from just under to just over 60 m.p.h. for the journey. The special representative tells us that "few can have any idea of what it feels like to be travelling in the cab as the 500 tons 'super-Pacific' thunders over the track." One can well believe it. Five hundred tons per locomotive outstrips even the latest American mammoth, which turns the scale, with tender, at but a paltry 400 tons, or slightly over. If the truth were told, however, the Nord "super-Pacific" engines weigh 94 tons without and 167 tons with their latest high-capacity tenders, when the latter are carrying their full complement of coal and water. The footplate passenger has confused the weight of the engine with that of the train behind it.

Later we read: "The footplates on which I stood began an uneven dance, the roar of the engine deafened my ears, and as I looked down to the ground some fifteen feet below, fear caused a cold shiver to run down my back." It well might, seeing that the passenger was apparently looking down from a height a clear foot greater than the total height of the chimney from the rail; he would be in extreme danger of losing his head by decapitation at the next overline bridge! I forbear to quote any further, save the driver's remark on passing Creil at speed: "It took us 44 minutes to do those 50 miles," which had to be repeated three times before the passenger caught the drift of it above the din. The French driver is to be congratulated on his mastery of idiomatic English! To crown all, I received subsequently from an intimate friend a letter which enquired, *inter alia*: "Was it you who wrote the recent *Morning Post* article on a footplate run by the 'Golden Arrow' from Calais to Paris? I *fancied* I detected your style—at least the non-technical style reserved for your popular articles—but I would not swear to it." *Et tu, Brute!*

Last of all, I have to mention a weighty leading article which recently diversified the columns of the *Evening Standard*, sent to me by a correspondent who desired comment on the matter, as the excerpts previously quoted. Here we have not so much a question of fact as of airy generalisation with little or nothing in the way of fact to support it. "Yesterday," the editorial begins, "We commended to Mr. Churchill the railways as possible recipients of the sort of benevolence which blesseth both him who gives and him who receives. We make no excuses for returning to the subject to-day, since every indication points to it as being of the first importance. The railways are evidently and admittedly some distance below the level of technical perfection. It is, indeed, from lack of enterprise in the past that the present relatively low level of technical efficiency has arisen. As we pointed out yesterday, shockingly poor progress has been made in the replacement of coaches which are lit by gas and coaches which are inadequately warmed. Little has been done in the matter of speed during the past seventy or eighty years, and we are still far from the maximum speed of 150 miles an hour and the whole-run speed of 120 miles an hour which such an expert as Lord Monkswell considers perfectly feasible. If the railways had devoted to experiments of this nature half the energy and enterprise which the motor industry has shown in the pursuit of high speeds, they would give us services of a much higher value." The article contained a great deal else in much the same strain.

"Evidently and admittedly," we are told, the railways are some distance below the level of technical perfection. Where is the evidence and whose is the admission? British railways are certainly not

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1. **UP LEEDS EXPRESS. 4-6-2 No. 2555, "CENTENARY."** *Photo C. Laundy.*

2. **PART OF 1-15 P.M. DOWN SCOTTISH EXPRESS. 4-4-2's, Nos. 4439 and 3294.**
*Photo H. Gordon Tidey.*

3. **DOWN CROMER EXPRESS. NEW 3-CYLINDER 4-6-0, No. 2803 "FRAMLINGHAM."**
*Photo F. R. Hebron.*

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perfect, but the writer makes the fatal error of overstating his case.

To give as an example of railway sins of omission the "shockingly poor progress" in replacement of gas-lighted coaches by those electrically-lit is ludicrous. Has anyone as yet had the hardihood to suggest that all internal-combustion road-motor vehicles should immediately be replaced by electrically-propelled vehicles, because of the various instances, such as the recent terrible case near Reading, in which escaping petrol has caused deaths by fire? The failure of the railways to accelerate their trains to 120-m.p.h. schedules is another absurd complaint. Air resistance alone would prevent the maintenance of any speed greatly in excess of 100 m.p.h. by railway trains of any kind—the 130 m.p.h. attained by single cars in the Marienfeld-Zossen experimental trials may be regarded as the highest practicable limit, and even this speed raised various serious questions in regard to safety—and with the steam locomotive of normal design internal resistance, of various kinds, would certainly render out of the question any speed much above 100 m.p.h. downhill and 85 or so on the level, even in the most favourable conditions. Further, as regards the comparison made between road and rail progress in speed, have the enormous speeds attained by Major Segrave and others in various trials of racing cars had the remotest influence on the average speed of road travel?

Lastly, if any attempt were made to run express trains at the most fabulously high speeds possible, and it were found not to be a paying proposition, or any accident resulted, the *Evening Standard* would doubtless be among the first to draw serious conclusions from this further evidence of railway mismanagement. I do not dispute for one moment that much could and should be done to improve the present long-distance services. As previously mentioned, the capacity of present-day British express locomotive types would permit of a 60-m.p.h. overall average speed over most of the British main lines, given reasonable loads, still leaving some margin in hand for contingencies. The runs I am about to describe will afford some substantial evidence of this.

L.M.S. 6.5 P.M. EUSTON—MANCHESTER.
Engine: Caprotti valve 4-cyl. 4-6-0 "Claughton" No. 6013.
Load: 50 axles; 357 tons empty; 380 tons full.

| Distance. | | Schedule. | Actual. | Speeds. |
|---|---|---|---|---|
| Miles. | | min. | m. s. | m.p.h. |
| 0·0 | Euston .. .. | 0 | 0 00 | — |
| 5·4 | Willesden Jc. .. | 9 | 8 50 | — |
| 8·1 | Wembley.. .. | — | 11 30 | 61½ |
| 11·4 | Harrow .. .. | — | 14 50 | 57½ |
| 13·3 | Hatch End .. | — | 16 55 | 57 |
| 17·5 | Watford .. .. | 22 | 20 55 | 64½ |
| 21·0 | King's Langley .. | — | 24 20 | 60 |
| 24·5 | Boxmoor.. .. | — | 27 55 | 57 |
| 28·0 | Berkhamsted .. | — | 31 35 | 56½ |
| 31·7 | Tring .. .. | 39 | 35 35 | 56½ |
| 36·1 | Cheddington .. | — | 39 30 | 75 |
| 40·2 | Leighton .. .. | — | 42 55 | 70½ |
| 46·7 | Bletchley.. .. | 53 | 48 40 | 70½ |
| 52·5 | Wolverton .. | — | 53 30 | 75 |
| | | | sigs. | 5 |
| 54·8 | Castlethorpe .. | — | 55 45 | — |
| 59·9 | Roade .. .. | 66 | 63 45 | 50½ |
| 62·9 | Blisworth.. .. | 69 | 66 50 | 69 |
| 69·8 | Weedon .. .. | — | 72 40 | 75 |
| 75·3 | Welton .. .. | — | 77 35 | 66 |
| 80·3 | Hillmorton .. | — | 82 10 | 66 |
| | | | sigs. | 20 |
| 82·6 | Rugby .. .. | 89 | 85 40 | — |
| | | | sigs. | 20 |
| 88·1 | Brinklow.. .. | — | 93 35 | 61½ |
| 91·4 | Shilton .. .. | — | 96 40 | 64½ |
| 93·5 | Bulkington .. | — | 98 40 | 70½ |
| | | | sigs. | 50 |
| 97·1 | Nuneaton .. | 105 | 102 00 | — |
| 102·3 | Atherstone .. | — | 106 40 | — |
| 106·5 | Polesworth .. | — | 110 10 | 74 |
| 110·1 | Tamworth .. | 119 | 113 10 | 74 |
| 116·3 | Lichfield .. .. | 125 | 118 40 | 56½ |
| 121·1 | Armitage.. .. | — | 123 25 | 65 |
| 124·3 | Rugeley .. .. | 133 | 126 20 | 65 |
| 127·2 | Colwich .. .. | — | 129 10 | — |
| 129·6 | Milford .. .. | — | 131 35 | 58½ |
| 133·6 | Stafford .. .. | 143 | 136 30 | 35* |
| 136·9 | Great Bridgeford | — | 140 45 | 52 |
| 138·9 | Norton Bridge .. | 150 | 143 05 | 53 |
| 143·5 | Standon Bridge .. | — | 148 10 | 55½ |
| 147·6 | Whitmore .. | 160 | 152 40 | 55½ |
| 150·2 | Madeley .. .. | — | 155 15 | — |
| 153·4 | Betley Road .. | — | 158 10 | 70½ |
| | | — | sig.stop | 0 |
| 158·1 | Crewe .. .. | 170 | 166 10 | — |
| 162·6 | Sandbach.. .. | 176 | 173 30 | 57½ |
| 166·4 | Holmes Chapel .. | — | 177 15 | 64½ |
| 168·4 | Goostrey .. .. | — | 179 05 | 61½ |
| 172·2 | Chelford .. .. | — | 182 45 | 64½ |
| 175·2 | Alderley Edge .. | — | 185 40 | — |
| 176·9 | Wilmslow .. | 191 | 188 20 | — |
| 1·7 | Styal .. .. | — | 3 30 | 47½ |
| 4·9 | Gatley .. .. | — | 6 30 | 80½ |
| 6·1 | East Didsbury .. | — | 7 25 | — |
| 7·9 | Mauldeth Road .. | — | 8 50 | 70½ |
| 9·8 | Slade Lane Jc.* .. | 12 | 10 50 | 40 |
| 11·6 | Manchester (London Road) .. | 17 | sigs. 15 40 | 20 — |

* Service slack.

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There is, first of all, a down journey on the L.M.S. West Coast main line, which serves the double purpose of illustrating the point at issue, and answering the query of a correspondent as to the performance of the rebuilt "Claughtons" in which the Caprotti valve-motion has been fitted. The run about to be described was the most cheerful experience that I have had on the L.M.S. for years past; in fact, the engine seemed almost irrepressible in the gaiety of its progress. The train was the 6.5 p.m. down Manchester express, made up to 12 vehicles, weighing 357 tons empty and 380 tons gross, and the locomotive was No. 6013, stationed at Longsight. For reference purposes I have tabulated the journey. In brief, time was improved on by 2¾ min. to Wilmslow, despite a dead slowing for signals at Castlethorpe, signals badly on before and after Rugby, a slight check before Nuneaton and a dead stand outside Crewe, costing between them the 8 min. and the odd seconds, which reduced the net time to exactly three hours for the journey of 176.9 miles. Had it not been for the easing of the engine from Rugeley onwards, this could have been cut further, but the signal checks—obviously from the 5.55 "Merseyside Express," just in front of us—made it idle to hurry any more.

Net times out of London were, roughly, 81¾ min. for the 82.6 miles to Rugby, 131 min. for the 133.6 miles to Stafford and 157¾ min. for the 158.1 miles to Crewe—all of them inside "even time." It will be seen that we accelerated up the 1 in 330 from the Castlethorpe check to 50½ m.p.h., and reached the unusual speed—at this location—of 75 m.p.h. at Weedon. Before Castlethorpe, when we passed the 54th mile-post in 54 min. 50 sec., we had all but attained "even time," and the 5.50 and 5.55 ahead of us must both have been running well to permit of this being done. There was quite a thrilling conclusion to the journey, also, as in the dip at Gatley we reached what is easily my record speed between Crewe and Manchester—a momentary "80"—thereby gaining a further 1¼ min. We ran into London Road at 9.28 p.m., 2 min. early, but the gain to engine in running had been fully 12½ min.

I have next to describe three runs of a very remarkable character, all on the 7.50 a.m. L.N.E.R. express from Leeds to London, which has the distinction of claiming the second fastest scheduled run on the Great Northern section of the L.N.E.R. The booked time of 111 min. from Grantham to King's Cross, entailing an average speed of 57.0 m.p.h., was the highest until the recent acceleration of the up "West Riding Pullman" wrested the premier place from the earlier train by a decimal point or two, as between Wakefield and London. But the 7.50 a.m. has been gradually increasing in weight, like most L.N.E.R. expresses, and is generally a train of well over 300 tons. On two of these occasions the gross load was 340 tons, and on the last no less than 380 tons; yet the schedule of 111 min. was cut successively to 106¾, 103¾ and 104¼ min., or 104, 103¾ and 103 min. net—the last-named with the heaviest load—for the 105½-mile journey. These records reach me from two independent correspondents, whose ability in the work of recording is beyond question, and, as one of them says, the remarkable achievement of Pibworth on the up *Flying Scotsman* last summer, to which attention was drawn in these columns, must now take a back seat. "I was in a prehistoric six-wheeler at the very end of the train," one of my friends writes, ruefully, in connection with *Coronach's* exploit, "which together with a non-corridor twin was attached at Grantham, making our departure 6 minutes late, and the descent from Stoke to Werrington was hardly equalled by a rough Channel crossing!"

Nothing short of complete tabulation will do the running justice. First of all, the downhill times of 11 min., 30, 48 and 15 sec. from Corby to Helpston give averages over this 15.2 miles of 79.3, 77.3 and 81.1 m.p.h., with maxima of 86½, 82 and 88½ m.p.h., respectively. There should then be noted the remarkable sequence of 24 min. 30 sec., 24 min. 12 sec., and 23 min. 40 sec. from Huntingdon to Hitchin, against the general tendency of the road, and concluding with 1 in 200 up for some miles. The electrifying finish of *Great Northern* next compels attention, going over Potter's Bar at 62 m.p.h., and almost certainly — from the times — crossing



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L.N.E.R. 9.44 A.M. GRANTHAM—KING'S CROSS.

| Distance. | Engine, 4-6-2 No. .. / „ Name .. / Load (axles) .. / „ (tons tare) .. / „ ( „ full) .. | Schedule. | 4471 *Sir Frederick Banbury* 42 318 340 | | 4470 *Great Northern* 42 318 340 | | 2747 *Coronach* 51 356 380 | | 4450 4-4-2 type 32 297 310 |
|---|---|---|---|---|---|---|---|---|---|
| Miles. | | min. | m. s. | m.p.h. | m. s. | m.p.h. | m. s. | m.p.h. | m. s. |
| 0·0 | Grantham .. .. | 0 | 0 00 | * | 0 00 | * | 0 00 | * | †0 00 |
| 3·5 | Great Ponton .. .. | — | 6 35 | — | 6 45 | — | 7 00 | — | 4 12 |
| | | — | p.w.s. | 25 | — | — | — | — | — |
| 5·4 | Stoke Box .. .. | — | 10 25 | — | 9 35 | 42 | 9 45 | 45 | 6 33 |
| 8·4 | Corby .. .. .. | — | 13 50 | — | 12 47 | — | 12 45 | 72½ | 9 21 |
| 13·3 | Little Bytham .. .. | — | 17 45 | 86½ | 16 43 | 82 | 16 30 | 88½ | 12 57 |
| 16·9 | Essendine .. .. | — | 20 20 | — | 19 20 | 82 | 19 00 | 86½ | 15 21 |
| 20·7 | Tallington .. .. | — | 23 05 | 82½ | 22 15 | 76 | 21 45 | 83½ | 18 03 |
| | | | | | | | | | p.w.s. |
| 23·6 | Helpston .. .. | — | 25 20 | 80½ | 24 35 | — | 24 00 | 79 | — |
| 26·0 | Werrington Junction .. | — | 27 10 | — | 27 50 | ¶55 | 25 50 | 75 | 25 09 |
| 29·1 | Peterborough .. .. | 31 | 30 30 | 20§ | 30 20 | 20§ | 29 15 | 20§ | 28 54 |
| 30·5 | Fletton Junction .. | — | 32 55 | — | 32 56 | — | 31 50 | — | 31 12 |
| 32·9 | Yaxley .. .. .. | — | 35 45 | 61 | 35 35 | 62 | 34 45 | 60 | 33 54 |
| 36·1 | Holme .. .. .. | — | 38 50 | 67 | 38 49 | 66 | 37 50 | 67 | 36 42 |
| 42·0 | Abbot's Ripton .. | — | 44 25 | 54 | 44 29 | — | 43 30 | 55 | 41 57 |
| 43·5 | Leys Box .. .. | — | 46 10 | 53 | 46 15 | 54 | 45 15 | 53½ | 43 27 |
| 46·6 | Huntingdon .. .. | 50 | 49 00 | 73½ | 49 05 | 74 | 48 00 | 76½ | 46 03 |
| 49·5 | Offord .. .. .. | — | 51 25 | 73½ | 51 25 | 74 | 50 20 | 75 | 48 18 |
| 53·8 | St. Neot's .. .. | — | 55 05 | 63 | 55 05 | — | 53 55 | 66 | 51 45 |
| 58·0 | Tempsford .. .. | — | 58 50 | 71½ | 58 45 | 68 | 57 35 | 73½ | 55 15 |
| 61·4 | Sandy .. .. .. | — | 61 45 | 67 | 61 42 | 67 | 60 25 | 70½ | 58 00 |
| 64·4 | Biggleswade .. .. | — | 64 30 | 66 | 64 23 | — | 63 05 | 71½ | 60 27 |
| 68·5 | Arlesey .. .. .. | — | 68 30 | 64½ | 68 16 | — | 66 50 | 68 | 64 06 |
| 69·8 | Three Counties .. .. | — | 69 45 | 61½ | 69 30 | — | 68 00 | 66 | 65 15 |
| | | — | — | — | — | — | — | — | sigs. |
| 73·6 | Hitchin .. .. .. | 77 | 73 30 | 55½ | 73 17 | 50 | 71 40 | 57 | 69 36 |
| | | — | p.w.s. | 30 | — | — | — | — | — |
| 76·9 | Stevenage .. .. | — | 78 25 | — | 77 17 | 50 | 75 35 | 49½ | 75 39 |
| 80·5 | Knebworth .. .. | — | 83 00 | — | 81 08 | — | 79 25 | 57 | 79 24 |
| 83·5 | Welwyn North .. .. | — | 86 15 | — | 84 13 | — | 82 25 | — | 82 12 |
| 87·8 | Hatfield .. .. .. | 92 | 90 00 | 75 | 87 43 | 74 | 86 00 | 76½ | 85 42 |
| 92·8 | Potter's Bar .. .. | — | 94 45 | 61½ | 92 15 | 62 | 90 50 | 59 | 90 06 |
| 96·3 | New Barnet .. .. | — | 97 55 | — | 95 20 | 75 | 94 05 | 75 | 93 14 |
| 100·5 | Wood Green .. .. | — | 101 10 | 79 | 98 31 | — | 97 20 | 79 | 96 27 |
| 102·9 | Finsbury Park .. .. | — | 103 20 | — | 100 47 | — | 99 30 | — | 98 39 |
| ↖ | | — | — | — | — | — | sigs. | — | — |
| 105·5 | King's Cross .. .. | 111 | 106 45 | — | 103 45 | — | 104 10 | — | 103 24 |
| 105·5 | Net times (min.) .. | 111 | 104 | — | 103¾ | — | 103 | — | ‡97¼ |

* Max. or min. speeds at or near places indicated. † Passing time.
‡ From passing Grantham at speed. § Service slack. ¶ Speed reduced for track-troughs.

the "eighty" line again at New Southgate, though my correspondent has not recorded the fact. It should be remarked, finally, first that the two earliest of the Gresley "Pacifics" were concerned in making two of these runs, while the finest of the journeys goes to the credit of one of the most recent high-pressure "Super-Pacifics," *Coronach*. It may be added that this engine was ably handled by J. Morley and fired by L. Lee, of Doncaster shed, while the officiating genius on *Sir Frederick Banbury* was Tomblin, who has figured in these columns previously in connection with my footplate runs on *Enterprise*; I have no information as to the driver of *Great Northern*. On another recent occasion (according to rough particulars supplied by a further corre-

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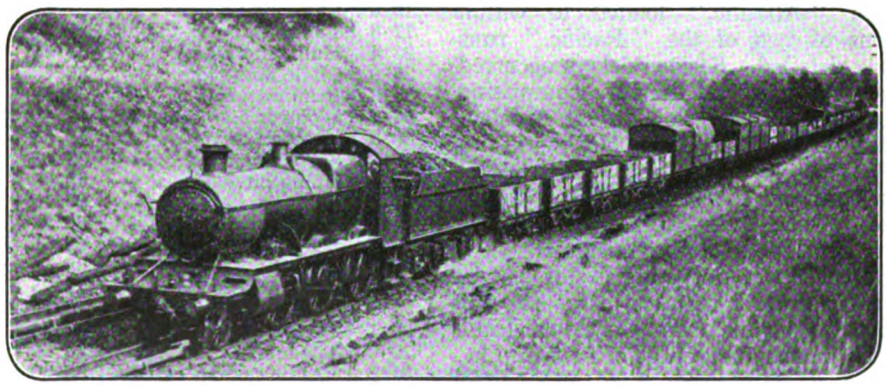

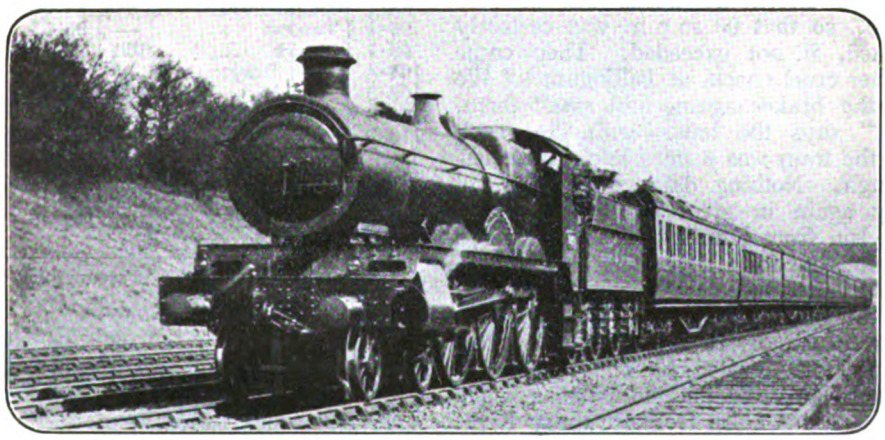

**1. 11 a.m. WEST OF ENGLAND EXPRESS NEAR TAUNTON, 4-6-0 No. 6000 "KING GEORGE V."** *Photo. F. R. Hebron.*

**2. EXPRESS GOODS TRAIN, 2-6-0 No. 5317.** *Photo. H. Gordon Tidey.*

**3. DOWN CHELTENHAM AND GLOUCESTER EXPRESS, "CROOME COURT," 4-6-0 No. 2930.** *Photo. H. Leslie Good.*



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spondent), "Pacific" No. 4474, *Victor Wild*, of Plymouth fame, left Peterborough 10 min. late with the Leeds train due in King's Cross at 1.5 p.m. and made up 9½ min., covering the 76.4 miles with 420 tons in 77½ min., start-to-stop.

That these are not isolated occurrences is clear from yet another letter, which I have most fortunately received just in time to squeeze the data which it contains into the L.N.E.R. table. The writer was on board the up Sunday "Harrogate Pullman" on April 7, and was lucky in having both Barnes as his driver, and in the number of *en route* delays necessary to stir that well-known expert and his engine to some perfectly amazing running—the more so in that the engine was but an "Atlantic," loaded to within 20 tons of two of the "Pacific" runs already detailed. Serious delays occurred in the earlier part of the run, comprising bad permanent-way slowings at Ardsley, Rossington and Cromwell, Muskham and Trent, near Newark, from which point Barnes ran up to Grantham in 15 min. 3 sec. Once over Stoke Summit, the engine developed some tremendous speed; the observer was not using a stop-watch, but a time of 3 min. 36 sec. for the 5 miles 70 chains from Corby to Little Bytham means an average of 81.3 m.p.h., and 2 min. 24 sec. for 3 m. 47 c. from there to Essendine works out at 89.7 m.p.h., so that 90 m.p.h. was certainly touched, if not exceeded. Then came another cruel check, at Tallington—"We had the brakes again, and *smelt* them, too!" says the letter—with the result that the train was 6 min. late past Peterborough. Nothing daunted, Barnes got away again in great style, and would have run from Huntingdon to Hitchin in 23 min., but for a signal check approaching the latter station, which increased this time by 33 sec. With all these checks, the train actually rolled into King's Cross ½-min. early, after having left Leeds 4½ min. late, and that notwithstanding a most cautious finish from Finsbury Park. Net time from passing Grantham to London was 97¼ min., or, with a normal finish from Finsbury Park, not over 96 min., quite eclipsing the "Pacific" achievements already described. My correspondent estimates the net time from Leeds to London as 184 min., or 21 min.

G.W.R. 5.15 P.M. BRISTOL—PADDINGTON.
Engine: 4-cyl. 4-6-0 No. 4025, *Italian Monarch*.
Load to Swindon: 12 vehicles; 365 tons tare; 390 tons full.
Swindon to Reading: 10 vehicles; 311 tons tare; 330 tons full.
Reading to London: 8 vehicles; 244 tons tare; 260 tons full.

| Distance. | | Schedule. | Actual. | Speeds. |
|---|---|---|---|---|
| Miles. | | min. | m. s. | m.p.h. |
| 0·0 | Bristol .. .. | 0 | 0 00 | — |
| 1·6 | Stapleton Road .. | — | 4 30 | 39 |
| 4·8 | Filton Jc. .. | 9½ | 11 00 | 24 |
| 5·9 | Stoke Gifford .. | 12 | 12 50 | 45 |
| 9·1 | Coalpit Heath .. | — | 16 45 | 46½ |
| 13·0 | Chipping Sodbury | — | 21 50 | 47 |
| 17·6 | Badminton .. | 25 | 27 35 | 47 |
| 23·4 | Hullavington .. | — | 33 15 | 72½ |
| 27·9 | Little Somerford | — | 36 45 | 76½ |
| 30·6 | Brinkworth .. | — | 39 00 | *64 |
| 34·7 | Wootton Bassett | 41 | 42 45 | †55 |
| 40·3 | Swindon (slip) .. | 47 | 48 35 | 64 |
| 46·0 | Shrivenham .. | — | 53 45 | 70½ |
| 51·1 | Uffington.. .. | — | 58 00 | 71½ |
| 53·7 | Challow .. .. | — | 60 10 | 74 |
| 57·2 | Wantage Road .. | — | 62 50 | 75 |
| 61·1 | Steventon .. | 65 | 65 55 | 76½ |
| 64·5 | Didcot .. .. | 68 | 68 40 | 76½ |
| 69·1 | Cholsey .. .. | — | 72 25 | 76½ |
| 72·9 | Goring .. .. | — | 75 15 | 75 |
| 76·1 | Pangbourne .. | — | 78 00 | 72½ |
| 79·0 | Tilehurst .. .. | — | 80 25 | 72½ |
| 81·6 | Reading (slip) .. | 84 | 83 20 | †40 |
| 86·6 | Twyford .. .. | — | 88 45 | — |
| 93·4 | Maidenhead .. | 94½ | 94 30 | 72½ |
| 95·1 | Taplow .. .. | — | 95 55 | 72½ |
| 99·1 | Slough .. .. | 100 | 99 15 | 74 |
| 104·4 | West Drayton .. | — | 103 35 | 70½ |
| 108·5 | Southall .. .. | 109 | 107 10 | 69 |
| 111·9 | Ealing .. .. | — | 110 00 | 71½ |
| 113·3 | Acton .. .. | — | 111 15 | 71½ |
| | | | sigs. | |
| 116·3 | Westbourne Park | — | 114 35 | — |
| | | | sigs. | |
| 117·6 | Paddington .. | 120 | 119 40 | — |

* Speed before shutting off steam for Wootton Bassett.
† Service slack.

inside schedule, and over a mile-a-minute average for the journey of 185.7 miles. The 97.5 miles from Stoke to Finsbury Park were run in 92 min. 6 sec., or 86 min. net, which, inclusive of the severe Peterborough slowing, entailed an average rate of 68 m.p.h. throughout.

If this were not enough, while correcting the proofs of this article I have received details of yet another run, on

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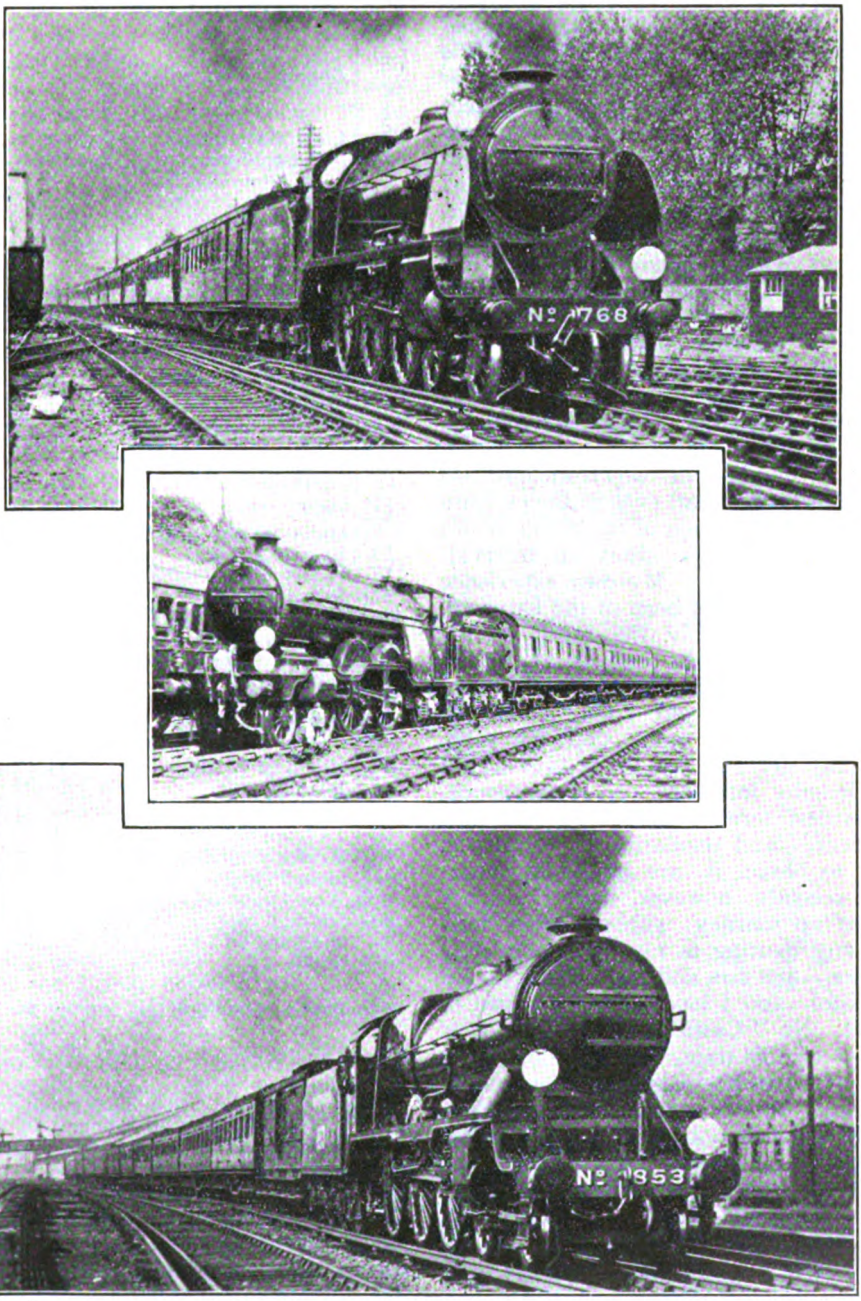


1. DOWN CONTINENTAL EXPRESS, 4-6-0 No. E768 "SIR BALAN." *Photo. A. C. Wright.*

2. DOWN NEWHAVEN BOAT TRAIN NEAR EARLSWOOD, 4-4-2 No. B39 "HARTLAND POINT." *Photo. P. Ransome Wallis.*

3. DOWN CONTINENTAL EXPRESS, 4-6-0 No. E853 "SIR RICHARD GRENVILLE."



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the up "West Riding Pullman," wherein Driver Topliss and No. 4459 worked 255 tons from Wakefield to King's Cross in 180½ min., despite a signal stop, four other signal checks and two permanent way checks! The *clou* of this run was the astounding time of 22 min. 40 sec. from Huntingdon to Hitchin. But I must really reserve these details for next month.

It is difficult to know which out of all the Great Western main routes to select for examples of high-speed travelling, but I have just received from an earlier writer of these articles—Mr. R. E. Charlewood, of whose competence in the matter of recording it is quite superfluous to speak—details of a series of runs on the 5.15 p.m. two-hour express from Bristol to Paddington, which include two of such brilliance that, even at the expense of going over so much of the South Wales route again after so short an interval, they merit mention. My own experience of this train has not been of the happiest, but this is probably the result of the curious habit which prevails at Bristol shed of massing all the main-line passenger drivers into one enormous "link," with the result that the same men only get any one train to work at very lengthy intervals. In consequence, the hardest turns, which need the most experience—and regularity of working in order to obtain it—are bound to suffer. I did recently, however, have one magnificent up journey, with a heavier load than any figuring in my correspondent's selection—368 tare and 390 gross tons out of Bristol—and I have added this run to his list. No "Castle" or "King" ever appears on this train, and 390 tons represents, one would imagine, the maximum that any "Star" could be expected to handle on such a booking, with 2 miles at 1 in 75 up shortly after starting, the long 1 in 300 rise to Badminton, and the slow through Reading platform road to detach the slip. This is, in fact, easily the hardest to work of the four Bristol two-hour trains.

I might remark that my friend times invariably to mile-posts, and each figure in the distance column of his runs, therefore, represents an exact mile or quarter; my run, which appears separately, was timed, as usual, to the centres of stations, and to the nearest 5 sec. at each point.

G.W.R. 5.15 P.M. BRISTOL—PADDINGTON.

| Distance. | Engine: 2-cyl. 4-6-0 No. .. ,, Name .. Load (tare tons)— Bristol-Swindon Swindon-Reading Reading-London | Schedule. | 2915 *Saint Bartholomew* 287 253 220 | 2913 *Saint Andrew* 308 280 252 |
|---|---|---|---|---|
| Miles | | min. | m. s. | m. s. |
| 0 | Bristol (T.M.) .. | 0 | 0 00 | 0 00 |
| | | — | sigs. | — |
| 1¾ | Stapleton Road (1¾) | — | 7 26 | 4 10 |
| 2½ | Ashley Hill (2½) .. | — | 9 35 | 5 18 |
| 4 | Mile-post 4 .. .. | — | 14 02 | 8 31 |
| 4¾ | Filton Jc. (4¾) .. | 9½ | 15 23 | 9 53 |
| 5⅝ | Mile-post 112 .. | — | 16 36 | 11 19 |
| 9½ | Coalpit Heath (108½) | — | 20 52 | 15 35 |
| 13⅜ | Chipping Sodbury (104½) .. .. | — | 25 34 | 19 51 |
| 17⅝ | Badminton (100) .. | 25 | 30 54 | 24 44 |
| 5¾ | Hullavington (94½) | — | 7 17 | 7 22 |
| 13 | Brinkworth (87) .. | — | 13 11 | 13 04 |
| 17 | Wootton Bassett(83) | 41 | 16 58 | 16 41 |
| 22¾ | Swindon (77½)* .. | 47 | 22 34 | 22 01 |
| 28½ | Shrivenham (71½) .. | — | 27 25 | 26 24 |
| 33½ | Uffington (66½) .. | — | 31 25 | 30 22 |
| 43½ | Steventon (56½) .. | 65 | 39 11 | 38 25 |
| 46¾ | Didcot (53¼) .. | 68 | 41 38 | 41 04 |
| 51½ | Cholsey (48½) .. | — | 45 22 | 44 59 |
| 58½ | Pangbourne (41½) .. | — | 50 48 | 50 48 |
| | | | — | sigs. |
| 63 | Mile-post 37 .. | — | 54 17 | 54 37 |
| 64 | Reading (36)† .. | 84 | 55 21 | 56 59 |
| 65 | Mile-post 35 .. | — | 56 44 | 2 19 |
| 69 | Twyford (31) .. | — | 60 33 | 6 30 |
| 75¾ | Maidenhead (24½) .. | 94½ | 65 47 | 12 01 |
| 81½ | Slough (18½) .. | 100 | 70 11 | 16 41 |
| 86¾ | West Drayton (13½) | — | 74 08 | 21 12 |
| 90⅞ | Southall (9⅛) .. | 109 | 77 22 | 24 54 |
| 94 | Mile-post 6 .. .. | — | 79 47 | 27 56 |
| 95¾ | Acton (4½) .. .. | — | 81 10 | 29 41 |
| | | | — | sigs. |
| 98¾ | Westbourne Park(1½) | — | 83 45 | 34 00 |
| | | | sigs. | sigs. |
| 100 | Paddington.. .. | 120 | 86 40 | 37 28 |

* Slip. † Slip and reduce speed for platform. (*Note.*—Figures in brackets in stations column indicate exact mile-posts at which times were taken.)

On the first run the train was stopped by signal at Lawrence Hill and delayed thence till past Stapleton Road by the 5.3 p.m. from Bristol to Cardiff in front, the speed at the top of the 1 in 75 (mile-post 4) being only 21½ m.p.h., and the loss in time 5 min. A special stop at Badminton caused further loss of time. But then the driver of *Saint Bartholomew* got away with such vigour that the 100 miles to Paddington were run in 86 min.

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40 sec., or 86¼ min. net, Reading slack included, at an average rate of 69.5 m.p.h. throughout. Between 94¼ and 37 miles—57¼ miles in all—the time was exactly 47 min., and the average 73 an hour. Another extremely rapid stretch was Maidenhead-Acton, 20 miles, covered in 15 min. 23 sec., equal to 77.9 m.p.h. The 77¼ miles from Swindon to Paddington were covered in 64 min. 6 sec., or 63½ min. net—equivalent to all but 10 min. off the 75-min. booking of the summer 3.45 p.m. up from Swindon. It is probable, from the times, that 80 m.p.h. was reached, both in the neighbourhood of Steventon and between Slough and West Drayton. Overall time from Bristol to Paddington, including 42 sec. standing at Badminton, was 118 min. 16 sec.; net time, allowing for the Bristol checks, the Badminton stop and the Westbourne Park check, was 109¾ min. On the second run the Badminton stop was again called, and in addition permanent-way operations in progress at Reading made it necessary to stop there to detach the slip coach, with a preliminary signal check; the two stops lasted 29 and 42 sec., respectively, but, despite an easy finish from West Drayton and 2 min. loss by signals from Old Oak to Paddington, the journey was completed in 120 min. 22 sec. The 64 miles from Badminton to Reading were run in 56 min. 59 sec., start-to-stop, and the 36 miles thence to Paddington in 37 min. 28 sec., or 35½ min. net. Minimum at Filton Summit was 25 m.p.h. To keep the 2-hour booking with *two* intermediate stops is a pretty astonishing feat!

In consideration of the load, my run behind *Italian Monarch* is in merit but little behind the other two. The driver nursed his engine as far as Badminton, but then set out with determination to effect a punctual arrival. Not only did we do so, but we should have been a shade over 3 min. early but for the checks inwards from Westbourne Park. The 95.7 miles from Badminton to Acton were run in 83 min. 40 sec., this average rate of 68.6 m.p.h. including careful slowings at Wootton Bassett and Reading. From Swindon to Tilehurst we ran 38.7 miles in 31 min. 50 sec., average 73 m.p.h., and from Twyford to Acton 26.7 miles in 22 min. 30 sec., average 71.2 an hour.

SOUTHERN RAILWAY: SALISBURY—WATERLOO.

Engine: Small superheated 4-4-0 No. 119.
Load: 20 axles; 137 tons tare; 145 tons full.

| Distance. | | Schedule. | Actual. | Speeds. |
|---|---|---|---|---|
| Miles. | | min. | m. s. | m.p.h. |
| 0·0 | Salisbury.. .. | 0 | 0 00 | — |
| 5·5 | Porton .. .. | — | 9 20 | 39½ |
| 11·0 | Grateley .. .. | — | 16 15 | — |
| 17·4 | Andover .. .. | 22 | 21 30 | 76½ |
| | | | | 56½ |
| 22·6 | Hurstbourne .. | — | 26 30 | 64½ |
| 24·5 | Whitchurch .. | — | 28 25 | 60 |
| 28·1 | Overton .. .. | — | 32 00 | 60 |
| 31·3 | Oakley .. .. | — | 35 15 | 60 |
| 33·4 | Worting Jc. .. | 39 | 37 10 | 66 |
| 35·9 | Basingstoke .. | 41½ | 39 20 | 72½ |
| | | | — | 76½ |
| 41·5 | Hook .. .. | — | 43 55 | 66 |
| 43·9 | Winchfield .. | — | 46 00 | — |
| 47·2 | Fleet .. .. | — | 48 50 | 75 |
| 50·5 | Farnborough .. | — | 51 40 | 69 |
| 51·7 | Sturt Lane Jc. .. | — | 52 45 | 64 |
| 55·7 | Brookwood .. | — | 56 30 | 70½ |
| 59·4 | Woking .. .. | 62½ | 59 30 | 77½ |
| | | | p.w.s. | 30 |
| 62·1 | Byfleet .. .. | — | 62 05 | — |
| 64·6 | Weybridge .. | — | 65 20 | — |
| 66·7 | Walton .. .. | — | 67 20 | 69 |
| 70·4 | Hampton Court Jc. .. .. | 73 | 70 30 | 71 |
| 71·7 | Surbiton .. .. | — | 71 40 | — |
| | | | sigs. | |
| 76·5 | Wimbledon .. | — | 77 50 | — |
| | | | sigs. | |
| 79·9 | Clapham Jc. .. | 82½ | 84 40 | — |
| | | | sigs. | |
| 82·4 | Vauxhall.. .. | 86 | 89 00 | — |
| 83·8 | Waterloo.. .. | 90 | 92 20 | — |

We came in from Swindon in 71 min. 5 sec., or about 68 min. net.

Singularly enough, my last run on the Southern Railway, in the very week of writing this article, has been one in which, again, "even time" was bettered from the start. It was made on the express which comes up from Exeter on Monday mornings only, leaving Salisbury at 11.28 a.m. and due at Waterloo at 1 p.m. Previously, in these columns, I have described a journey by this lightly-loaded express, and once again we had the same five-coach formation and the same type of engine—one of the superheated small Drummond 4-4-0 type, always noted



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for smart running. My notes of the beginning of the run were scanty, but after Grateley I was compelled to " sit up and take notice." We averaged over 60 m.p.h. from Andover up to Worting, and then ran the ensuing 26 miles to Woking in 22 min. 20 sec., at an average rate of exactly 70 m.p.h.—good going for such a veteran as this! We had a bad relay check just before Byfleet, but were well over 70 again by Hampton Court Junction, and unchecked we should have passed Surbiton, 71.7 miles from the start, in 69¾ min., and reached Waterloo in about 84 min. As it was, we succeeded in maintaining schedule time, despite the Byfleet check and the serious delays from Surbiton onwards.

Before leaving the Southern, I might mention details of the running between Waterloo and Bournemouth on the special occasion, in March last, when two-hour expresses were once again run in each direction (for the first time since 1914) in connection with the inauguration of the new Municipal Pavilion, the Duke of York being a passenger. The engine in both directions was No. 773, *Sir Lavaine*, of the " King Arthur " class, and the runs were timed by a reader. In the down direction there was a moderate load of 268 tons tare, and about 285 tons full, and an excellent start was made. Clapham Junction was passed in 7 min. 25 sec., Surbiton in 16 min. 10 sec., Woking in 28 min. 15 sec. and Basingstoke in 51 min. 55 sec., after which things were taken in very leisurely fashion down to Southampton, with times of 72 min. 5 sec. to Winchester, 78 min. 25 sec. to Eastleigh, and 85 min. 35 sec. to Southampton West, 79.2 miles. Brockenhurst, 92.8 miles, was cleared in 101 min. 50 sec., Christchurch, 104.3 miles, in 112¾ min., and Bournemouth Central was reached in 118 min. 25 sec. for the 107.9 miles. In the opposite direction the load was increased to the more substantial figure of 332 tare and 355 gross tons. Christchurch was passed in 6¼ min., Brockenhurst in 19¼ min., and Southampton West in the smart time of 33 min. for the 28.7 miles. Eastleigh was passed in 40 min. 50 sec. and Winchester in 48 min. 55 sec., while the time for the 25.7 miles from Eastleigh up to Basingstoke, chiefly rising at 1 in 250, was the excellent one of 30 min. 40 sec., this average of just over 50 m.p.h., including a p.w. relaying check. The 23.5 miles from Basingstoke to Woking were run in 20 min. 45 sec., but a second p.w. check was experienced between there and Surbiton. Woking to Surbiton took 13¼ min., Surbiton to Clapham Junction 9¼ min., and Clapham Junction into Waterloo 7¼ min., making a total of 40 sec. over the two hours from Bournemouth. This must have been a very fine run. It is very good news, by the way, that we are likely to see the reinstatement, at last, of two two-hour expresses daily between Waterloo and Bournemouth, on the inauguration of the summer train service.

Another reader has been good enough to forward the " journal " times of the running made by the special Great Western express trains run from London to Birkenhead in connection with the " Grand National." On the second of the three trains No. 111, *Viscount Churchill*, of the " Castle " class, despite signals on at High Wycombe, passed Ashendon, with 275 tons tare, in 48 min., Leamington in 86 min., and Birmingham, 110½ miles, in 108 min., reaching Shrewsbury in 157 min. for the 152.9 miles. The third train, with No. 4092, *Dunraven Castle*, and 218 tons only, passed Ashendon in 47, Banbury in 67, Leamington in 85, and Birmingham in 107 min., being stopped by signal in Wolverhampton, 123 miles from Paddington, in exactly " even time "—123 min. From Wolverhampton to Shrewsbury 32 min. were taken. Re-starting from Shrewsbury, the two engines took 30 and 29 min. to Ruabon, 25.4 miles, 51 and 52 min. to passing Chester Cutting, and 74 and 72 min. to Birkenhead (Woodside), 57 miles from Shrewsbury, with a number of service slacks. Total times for the 210 miles from Paddington were 237 and 236 min., including 6 min. standing in the former case and 9 min. in the latter. The remarkable running between London and Birmingham is yet further proof of the practicability of that " mile-a-minute " standard of express running which it has been one purpose, at least, of the present article to advocate. Owing to lack of space, my customary acknowledgment of correspondents' letters must be held over until next month.

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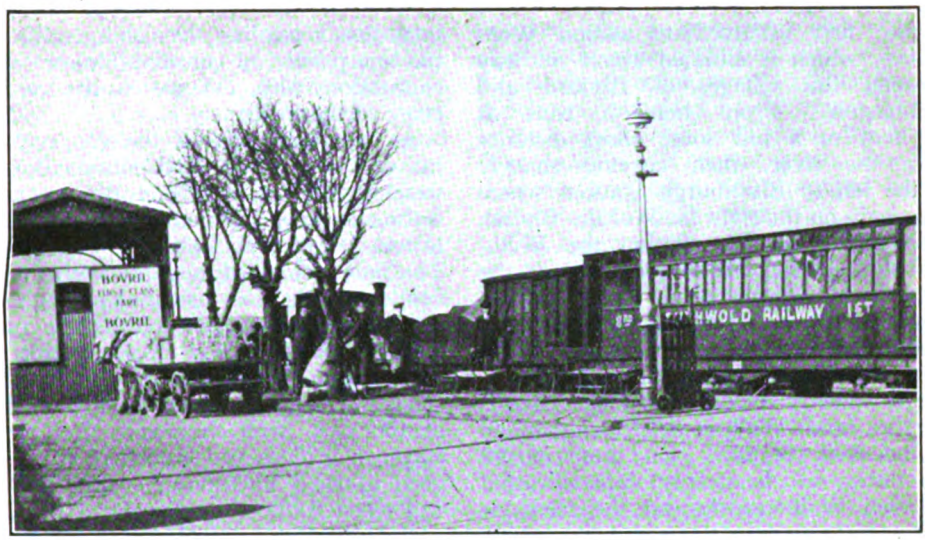


*Photo.*] SCENE AT SOUTHWOLD STATION. [*F. Foster.*

# The Southwold Railway.

By CHARLES E. LEE.

IN addition to incidental references, the Southwold Railway and its rolling stock was the subject of an article by the late Mr. H. L. Hopwood in May, 1914. At the same time, the fact that the line has recently been closed after practically 50 years of service, together with the fact that 15 years have elapsed since Mr. Hopwood's article was published, justify a brief account at the present time.

The main line of the old Great Eastern Railway was compelled by geographical considerations to take a somewhat inland course along the Suffolk coast, and at Halesworth, the nearest station to Southwold, the line is some 9 miles from the sea. Southwold was then served only by a yellow horse-omnibus, which ran from Darsham Station on the Great Eastern Railway to the "Swan Hotel," Southwold. The Southwold Railway was the outcome of a desire on the part of several prominent landowners in the neighbourhood to open up the district and make more readily accessible the then rising watering place of Southwold. Ransomes and Rapier, the well-known Ipswich firm of engineers, were largely interested in the project, and the late Mr. R. C. Rapier became the first chairman of the Company, holding that office until 1897.

The Southwold Railway Company was incorporated by Act of July 24, 1876, with powers to construct a line from the Great Eastern Railway at Halesworth to Southwold, with branches to the River Blythe Navigation at Halesworth and to the Black Shore Quay at Southwold, a total length, including branches, of 9½ miles. The original authorised capital was £40,000 in £10 shares. Constructional work was started in May, 1878, and the line was opened for public traffic on September 24, 1879, following inspection on the previous day. The gauge selected was 3 ft. and the line must, therefore, be numbered among the oldest narrow-gauge lines in Great Britain.

The line starts at Halesworth, with a station alongside and immediately east of the old Great Eastern station, transhipping platforms being provided here for the transfer of goods and coal traffic. Running almost due east the line is parallel with the main Great Eastern Railway line for a few yards, crossing over the roadway alongside it on a brick bridge. It follows the valley of the River Blythe



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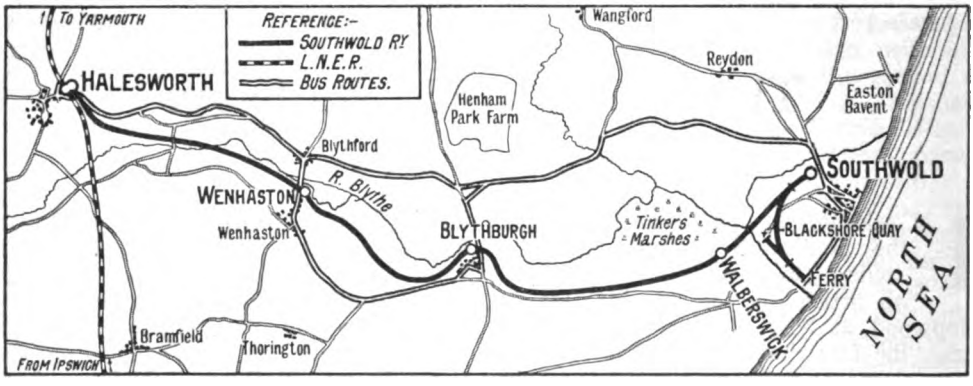
to the first intermediate station Wenhaston, which is situated about midway between the villages of Blyford and Wenhaston. From here it runs at the foot of a hill some short distance from the river, then curving sharply to the left to Blythburgh Station, where it is again on the right bank of the Blythe. Leaving Blythburgh Station the Blythford-Walberswick Road crosses over the railway by means of a girder bridge, immediately beyond which the line curves sharply to the right and then to the left, in a picturesque course through Blythburgh Woods before crossing Tinkers Marshes and Walberswick Common to Walberswick Station. On these curves the outer rail is steeply superelevated. Between Walberswick and the terminus at Southwold the River Blythe is crossed by a rather fine swing-bridge, built some little time before the war, then passing through a picturesque cutting across Southwold Common to the terminus adjacent to the main road from Southwold to Wangford, &c. At all stations the platforms, only a few inches high, are on the south side of the line. The total length of the line, apart from branches, is 8 miles 63 chains, the quarter-mile posts being measured from Halesworth.

The two branches mentioned in the original Act were not constructed at that time, but shortly before the war powers were again obtained to build the branch line to the harbour quay with a view to stimulating the fishing industry at Southwold. The branch was duly constructed, but the intervention of the war was responsible for frustrating the promoters' intentions regarding the fishing, although the line proved of considerable service in connection with defence works on the coast at this point.

As mentioned above, the gauge of the railway is 3 ft. Flat-bottomed rails, weighing 30 lbs. to the yard, are used, resting on single- or double-sole plates and fastened with fang bolts and dog spikes. The line is single throughout with the exception of the two terminal stations and a passing place at Blythburgh. The steepest gradient is 1 in 53. Although single, the possibility of doubling the track has been mooted from time to time in the past, with the result that in the cuttings, bridges and elsewhere space has been allowed for doubling the track as and when traffic should warrant it. This would, of course, prove of importance in the event of the London and North Eastern Railway deciding to take over the line and convert it to a single-track standard-gauge branch, as the clearance already allowed would suffice to accommodate a single standard-gauge track and corresponding rolling stock.




MAP OF SOUTHWOLD RAILWAY, L.N.E.R. AND BUS ROUTES.

At the time of closing down the Company possessed four locomotives, all of the side-tank type, six 6-wheeled passenger coaches and 39 wagons. The original locomotives, three in number, came from the Atlas Works, Manchester, of Sharp, Stewart & Co., in 1879, and were 2-4-0 side tanks with outside cylinders. On deciding, however, that two engines were sufficient to cope with the traffic at that time, No. 1 was returned to the makers and the remaining two, named, respectively, ***Halesworth*** and ***Blyth,*** were

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numbered 2 and 3 on the Company's books. In 1893 the increase in traffic justified obtaining an additional locomotive. This was secured from the same builders (Atlas Works, Glasgow) and named *Southwold*, being allotted the No. 1 which had remained blank since the first engine had been returned. *Southwold* was generally similar to the other two, excepting that it had the 2-4-2 wheel arrangement, a larger coal and water capacity and thus weighed some two tons more.

The numbers, names and dates of the various engines are:—

| No. | Name. | Makers' No. | Date Built. | Date Rebuilt. |
|---|---|---|---|---|
| 1 | *Southwold* | 3913 | 1893 | — |
| 2 | *Halesworth* | 2849 | 1879 | 1901 |
| 3 | *Blyth* .. | 2850 | 1879 | 1900 |
| 4 | *Wenhaston* | 1845 | 1914 | — |

The makers' number of the original No. 1 was 2848.

The engines have cylinders 8 in. x 14 in., 4-coupled wheels 2 ft. 6 in. in diameter, and a heating surface of 189 square feet, the working pressure being 140 lb. When delivered they were painted green, but subsequently the old livery of the Great Eastern, namely, blue with red lining, was adopted.

In 1914 the last of the company's locomotives, No. 4, was obtained. She is also of the side tank type, but with the 0-6-2 wheel arrangement. This engine, which was supplied by Manning Wardle & Co., of Leeds, was given the name *Wenhaston*. Of recent years the first three engines have been painted black, while No. 4 is dark green.

The repair shops and engine sheds are at Southwold terminus, but all heavy engine repairs were carried out either by the makers or at the Stratford works of the L.N.E.R. In this connection it is interesting to note that latterly the words "Stratford Works" were painted on the coupling rods of engine No. 3, *Blyth*. The railway is not equipped with a turntable, so that the locomotives necessarily worked alternate journeys in reverse.

The six passenger carriages are all of the six-wheeled type, built on Cleminson's system of flexible wheelbase. Combined centre buffers and loose couplings were fitted. Trains were braked by means of handbrakes applied by the guard on one of the carriages. The design of the coaching stock follows generally the line of single-deck tramcars, with side-doors at each end. The seats, covered with a strip of carpet, are arranged longitudinally along the sides of the vehicle. Two carriages are composite first and third class, the only difference in appointments being that blue cushions are provided on the seats of the first-class compartments.

The wagon stock of 39 vehicles consists

TRAIN ON THE SOUTHWOLD RAILWAY. [*L.N.E.R. Magazine.*

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mainly of four-wheeled open trucks, but also includes a few with six wheels and the Cleminson flexible wheelbase, chiefly used for coal traffic.

Being a single line, it was naturally worked with a train staff. There are home and starting signals, interlocked with the points at each station, operated by ground levers. The signals are of an old pattern, the semaphore working in slots in the posts. Each post carries two arms opposite each other, one each for up and down trains. Telephonic communication was maintained between the stations, the signal being lowered on receipt of advice that the train had left the previous station.

In 1913 the railway conveyed 108,677 passengers, 7,334 tons of merchandise and 6,474 tons of minerals. In 1927 it conveyed 81,704 passengers, 4,276 tons of merchandise, and 14,144 tons of coal and other minerals. Gross receipts in 1913 were £5,401, expenditure £3,598 and net receipts £1,803. In 1927 gross receipts were £7,122, expenditure £6,371 and net receipts £751.

The capital consists of £12,000 of 4 per cent. preferred debenture stock, £6,990 of 5 per cent. debenture stock, £9,000 in 5 per cent. preference shares and £40,000 in ordinary shares. In 1913 the ordinary shares received £2 per cent., from 1918-21 1 per cent., and in 1922 2 per cent., but since then no dividend has been paid on either ordinary or preference shares. On the preferred debenture stock interest has been paid in full until June 30, 1928, and on the 5 per cent. debenture stock to December, 1925.

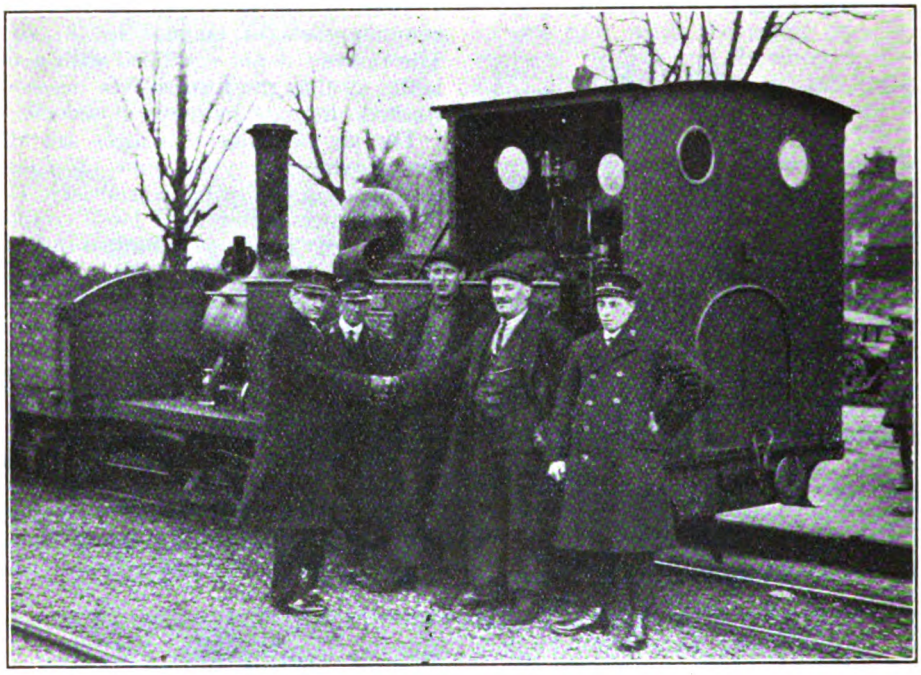

*Photo.*] A "GOODBYE" SCENE. [*Topical.*

Mr. V. G. Girling, Stationmaster, and Mr. J. Stannard, Enginedriver.

The train service of recent years has consisted of six trains on weekdays and four on Sundays in summer, and four on weekdays only in winter, all trains, except two on Sundays, connecting with the main L.N.E.R. service at Halesworth. The service has, somewhat unjustly, been the butt of local humorists for many years, notably in two series of clever cartoons issued by Mr. Reg. Carter, a Southwold artist, some years ago. One of this series is reproduced.

The possibility of the closure of the line was indicated by the chairman at the

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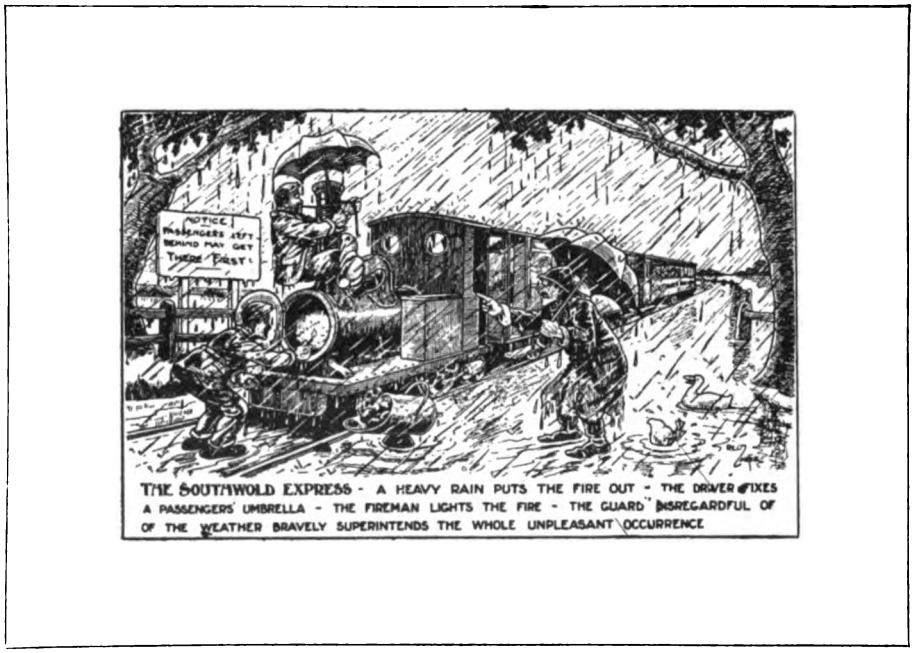
recent meeting of the company, when he explained that its financial position had been rendered so serious, largely because of motor-bus competition, that unless assistance were forthcoming from the Southwold Corporation and the London and North Eastern Railway, the Southwold line could not remain open. Mr. H. Ward, the manager and secretary, in a statement recently made to a representative of *The Times*, explained that the company had a certain amount of goods traffic, but it relied chiefly on its passenger services for revenue. Since the Southwold Corporation, in April, 1928, licensed motor coaches to pick up fares in its own boundaries the railway had lost the bulk of its passenger traffic, in spite of a cut in fares from 2s. 3d. to 1s. 6d. for the return journey in winter, with special return fares of 1s. from May to October during the holiday season. The company had been further handicapped by being restricted in the speed of its trains to 16 miles an hour, under Board of Trade regulations, whereas the motor coaches could run at 20 miles an hour. The outcome of all this was that the directors were compelled to close the line for all classes of traffic on the evening of April 11.

The L.N.E.R. have effected arrangements to preserve through communication and through bookings with Southwold by an agreement with the Eastern Counties Road Car Co., Ltd., whose service of omnibuses runs between Halesworth Station (L.N.E.R.) and Southwold Market Place in connection with all the principal trains calling at Halesworth. For goods-train traffic, parcels, &c., arrangements are being made to provide a road delivery service between Halesworth and Southwold, including the intervening villages.


NOTICE
PASSENGERS LEFT BEHIND MAY GET THERE FIRST
THE SOUTHWOLD EXPRESS - A HEAVY RAIN PUTS THE FIRE OUT - THE DRIVER FIXES A PASSENGERS' UMBRELLA - THE FIREMAN LIGHTS THE FIRE - THE GUARD, DISREGARDFUL OF OF THE WEATHER BRAVELY SUPERINTENDS THE WHOLE UNPLEASANT OCCURRENCE

**A SOUTHWOLD RAILWAY CARTOON.**

*From a set by R. Carter, published by the "Southwold Press."*

In conclusion, the writer wishes to acknowledge his indebtedness to Mr. H. Ward, the Manager and Secretary of the Southwold Railway Company, for his assistance in verifying various particulars, and to Mr. V. G. Girling, the Stationmaster at Southwold for his kindness and help on a recent visit to the line.

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# The Main Line Gradients of British Railways.

## VI.—LONDON AND NORTH EASTERN RAILWAY, SCOTTISH AREA.

By "VOYAGEUR."

WITH the present instalment we come to the end of the lines of the London and North Eastern Railway, whose grading has been brought under review. There could hardly be presented any greater contrast than that between the Lincolnshire lines, profiled last month, and the extraordinary severity of the London and North Eastern gradients in Scotland, here detailed. There is but one singularly level route among the Scottish main lines of the London and North Eastern Railway, between Edinburgh and Glasgow, but even that has "the sting in its tail," concluding, as it does, with the steepest main-line gradient in Scotland—the formidable 1 in 41 descent from Cowlairs into Queen Street terminus in Glasgow. Compared with that, the Waverley route, from Edinburgh to Carlisle, climbs first to an altitude of 880 feet in the 14 miles from Portobello to Falahill Summit, then drops into the valley of the Tweed at Galashiels, and after some steep undulations to the Teviot Valley at Hawick, climbs yet again in a bank of 10½ miles to 900 feet above the sea at Whitrope. Beyond there, for all but 10 miles continuously the line is inclined at 1 in 75 or thereabouts, so that even the "Pacifics," now in use over this route, must have their work cut out with the 400-ton trains which represent their maximum rostered loads.

On the sections going northwards from Edinburgh, by way of the Forth Bridge, there are no summits resembling Falahill or Whitrope in altitude, although the gradients are but little less severe, and the lines—especially the East Coast route proper—are infested with service slacks, most of them at the foot of rising gradients, where the loss of momentum is the more serious a consideration. When these severe hindrances are taken into account, it will be realised that many of the schedules over the old North British lines involve some remarkably creditable locomotive work, as the columns of "British Locomotive Practice and Performance" have often borne witness. The London Midland and Scottish (Caledonian) main line between Kinnaber Junction at Montrose and Ferryhill Junction at Aberdeen is, of course, included in the profile; and beyond Aberdeen the main line of the old Great North of Scotland Railway is given through by the Craigellachie route to Elgin. This covers practically all the express running north of Aberdeen, and may, in particular, be of use to any Aberdonians or others who try their hands at recording the locomotive work on those smartly-timed half-day excursion trips on Thursdays and Saturdays from Aberdeen to Speyside, which follow this route as far as Craigellachie Junction. It should be added, in concluding this introduction, that the East Coast main line from Berwick into Edinburgh figured as part of the first instalment of these articles, in January last, when the through profile from King's Cross to Edinburgh was reproduced.

### *EDINBURGH (WAVERLEY) TO CARLISLE* (Sheet 21).

The exit from Edinburgh as far as Portobello is shared with the East Coast trains, and with its sharp fall affords a good start, though speed must be reduced over Abbeyhill Junction. From Portobello, climbing begins at once, and apart from the level ¾-mile from Niddrie South Junction, is without intermission, though the 3¼ miles beyond this point, to Hardengreen Junction, are not severe. Of the next 8½ miles, 8 are at 1 in 70, the remaining ½ at 111, and a concluding mile at 100 making up the formidable ascent to Falahill. From there the



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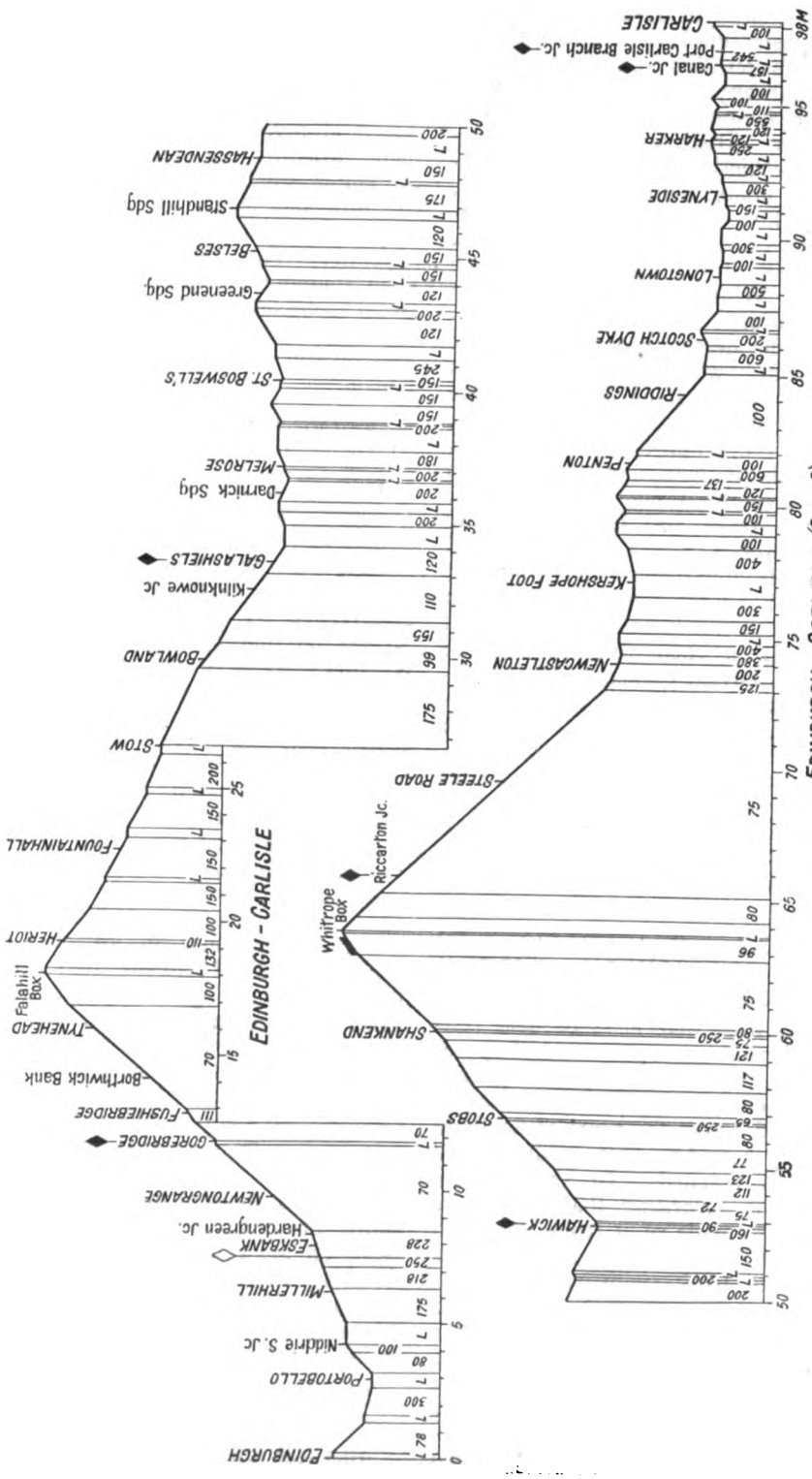


SHEET 21.—GRADIENT PROFILES, LONDON & NORTH EASTERN RAILWAY.

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descent to Galashiels is, as will be seen, on much easier grades, but, like all the long inclines on this route, cannot be descended at anything over the mile-a-minute rate, owing to its constantly winding character. There are sharp gradients between Galashiels and Hawick, culminating in the minor summit at Standhill, where the line crosses the ridge separating the Tweed and Teviot valleys. Then follows the terrific ascent from Hawick to Whitrope, begun right off Hawick platform end at 1 in 75, succeeded by the descent from Whitrope to Newcastleton, which, for unbroken severity, is the worst of the lot. There is a further steep descent past Riddings, ere the line drops into the Solway valley, along which it continues, with much reverse curvature along the river-bank past Scotch Dyke and Longtown, until finally it crosses the London Midland and Scottish main line at Kingmoor, and is led round some very sharp curves into the Citadel Station at Carlisle. It is clear that drivers are not to be envied when working express trains over such a route as this on, say, a bad winter's day, with strong winds and driving rain or snow. Yet the punctuality of working, whether achieved with the North British "Atlantics" or, now, with the "Pacifics," and the "Shires" on the lighter expresses, is always exemplary over the Waverley route.

*EDINBURGH (WAVERLEY) TO GLASGOW (QUEEN STREET)* (Sheet 22).

There is little that need be said concerning this route, except a word of appreciation for the masterly planning that enabled so comparatively direct a course to be carried across the heart of Scotland with barely a vestige of a gradient until Cowlairs is reached. In the circumstances, it is surprising that better use has not been made of it from the speed point of view, as, even with allowance for the Cowlairs bank, with which it terminates, it should be easily possible to complete the journey of 47¼ miles in the level hour, including one or even two intermediate stops. The present train service, too, lends itself, in its general arrangement, to a series of 60-minute expresses leaving each terminal at the even hour. It is common knowledge that the 1 in 41 of Cowlairs bank was the last British main line gradient on which rope haulage was employed, and it was only in comparatively recent years that the winding engine at Cowlairs was abandoned in favour of the present arrangement, whereby the engines, which bring the empty stock into Queen Street, assist the outgoing trains to Cowlairs, where they are detached by a special slip coupling. The colliery area traversed from Polmont to Lenzie is productive of speed restrictions at times, on account of subsidences, especially in the Falkirk Tunnel and at Waterside Junction, near Lenzie.

*EDINBURGH (WAVERLEY) TO PERTH* (Sheet 22).

This route keeps company with the Glasgow route as far as Saughton, to which point there are four tracks; the station at Saughton has now been abolished. A smart drop to Turnhouse is followed by the ascent to Dalmeny, where the line by which the Glasgow-Aberdeen trains travel, using the Glasgow-Edinburgh route as far as Winchburgh Junction, comes in at Dalmeny North Junction. Over the length of the Forth Bridge there is a restriction to 40 m.p.h., followed by the extremely steep descent to Inverkeithing; and owing to the severe slack round the Inverkeithing curve, this has, unfortunately, to be commenced by up trains at a low speed. The same disability attaches to the opposite direction, only in an even worse degree, the 8-mile ascent from here past Dunfermline being unbroken, and for most of its length at between 1 in 75 and 100 in steepness; down trains stopping at Dunfermline have, indeed, to re-start on a gradient of 1 in 74½. Between Dunfermline and Kelty a colliery area is again traversed, with occasional pitfall slacks in addition to the regular slowings for curves; and many of the gradients, though short, are very steep. But the worst bank on the route is the final one from Glenfarg down to Bridge of Earn, for just over 5½ miles continuously at 1 in 75, and a serious proposition for heavy trains in the up direction.

*EDINBURGH (WAVERLEY) TO ABERDEEN* (Sheets 22, 23 and 24).

Aberdeen trains follow the Perth route as far as Inverkeithing, whence they

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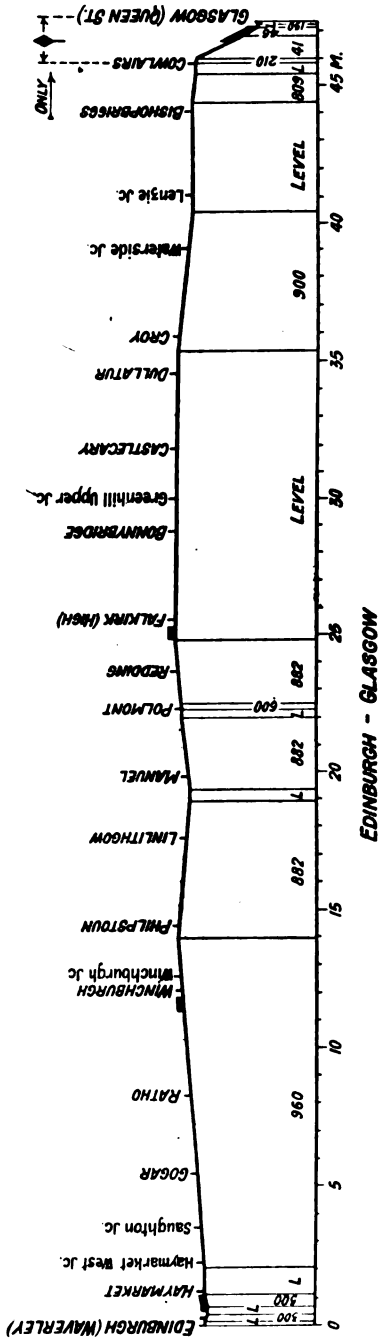


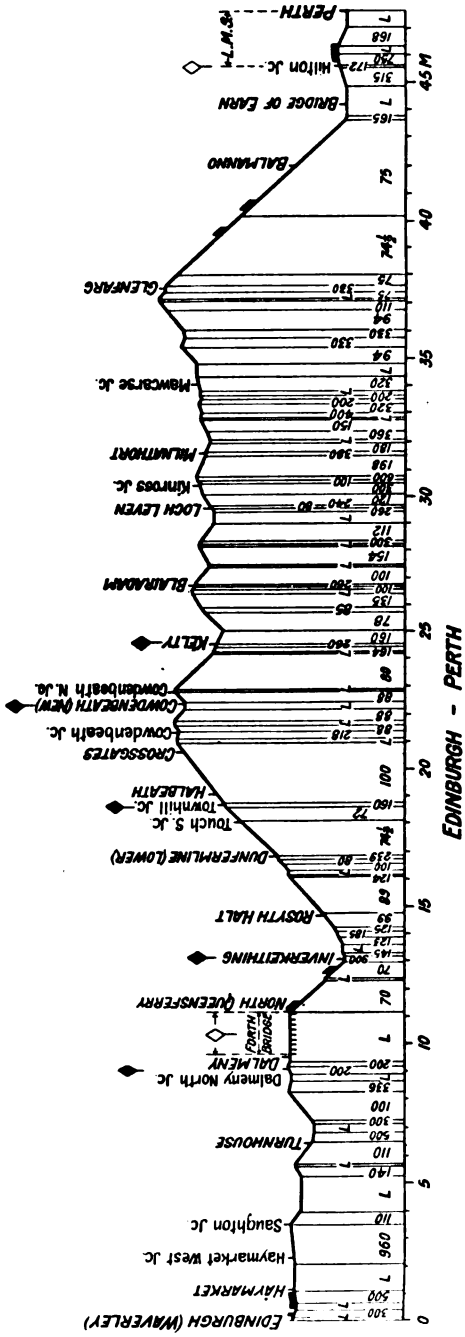


SHEET 22.—GRADIENT PROFILES, LONDON & NORTH EASTERN RAILWAY.

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branch to the right on a very sharp curve, followed by the steep ascent to Dalgetty and descent past Aberdour to Burntisland, where is enforced the next severe speed restriction. After that there are two well-defined "peaks"—at Dysart and Lochmuir—with a bad speed restriction at Thornton Junction, which prevents a "run" being taken at the banks in either direction. Falkland Road bank, with its 3½ miles at 1 in 95-111, is a handicap to heavy southbound expresses, but between Ladybank Junction and Dundee the going in both directions is considerably easier, apart from the very difficult start, partly at 1 in 66 and 74, for up trains out of the Tay Bridge Station at Dundee. From the other end of this station there is an even worse start—at 1 in 60, through tunnel, as far as Camperdown Junction—but it is very short, and there then follows a dead level intermission for over 15 miles along the coast, until just before Arbroath, where once again a bad start has been contrived for up trains by a gradient of 1 in 115 out of the station. There are heavy grades between Arbroath and Montrose, with several substantial lengths at from 1 in 106½ down to 1 in 88½, the latter being part of the stiff 3½-mile ascent which faces up trains immediately after leaving Montrose. In the direction of Kinnaber the start from Montrose is nearly as difficult; and the handicap over this length is further complicated by the continued existence of single-line working through from Lunan Bay to Kinnaber, where the London, Midland and Scottish main line from Carlisle to Aberdeen is joined. North of Kinnaber there are further long and heavy grades, notably the 3½ miles of Marykirk bank, the 4½ miles from Fordoun to beyond Drumlithie, the 5-mile descent to Stonehaven, and, worst of all, the 6¼-mile climb which faces trains starting southward from Aberdeen. This is, without question, one of the hardest main routes in Great Britain, every start from the intermediate towns at which all the expresses call—Dundee, Arbroath, Montrose and Stonehaven—having to be made up steeply-rising gradients, while recovery from the bad slacks at Inverkeithing, Burntisland, Thornton and elsewhere has to be made in similar conditions. It is small wonder that the 3-hour timing between Edinburgh and Aberdeen, instituted at the time of the fiercest competition with the Caledonian, even though it only entailed an overall average of 43½ m.p.h., had later to be eased out to a time more readily capable of observance.

### *ABERDEEN TO ELGIN* (Sheet 24).

As is generally the case with lines laid through poorly-paying territory, in which earthworks have been kept down to the minimum figure reasonably possible, the old Great North of Scotland main line has a constant succession of gradient changes, which cannot be reduced to any accurate averages for the purpose of simplifying the profile. For the first 1¼ miles out of Aberdeen, to Kittybrewster, the start is difficult, and includes ¾-mile at 1 in 72, but once past Dyce, the engines have level conditions ahead as far as Inveramsay. There, however, climbing begins in earnest, and continues for 11 miles, with strips at 1 in 100 at various points, until Kennethmont summit has been breasted at the 31¼ mile-post. With the exception of one short length at 1 in 100 just below that station, the subsequent 15 miles of falling grades are not steep, and there is nothing further of note until Keith has been passed. There are a couple of short 1 in 70 pitches from there to the summit beyond Drummuir, but the descent past Dufftown to Craigellachie is very bad, including as it does a mile at 1 in 60 and 3 miles at 1 in 78-80. Even this, however, pales beside the approaches to Coleburn "gable," between Craigellachie Junction and Elgin, with substantial stretches of 1 in 50 gradient; for 5½ miles out of Elgin the start is a formidable business indeed, 3¾ miles of it being at between 1 in 50 and 74. The coast route from Cairnie Junction to Elgin has not been profiled, as no appreciably fast running takes place over it; it is very steeply graded almost throughout.

#### DISTANCES.

**Edinburgh (Waverley) to Carlisle (Sheet 21).**

*Mile-posts, up (east) side, Edinburgh (zero) to Carlisle.*

| | Miles. |
|---|---|
| EDINBURGH (WAVERLEY) .. | 0.0 |
| *Abbeyhill Junction* (up) .. .. | 0.9 |
| *Piershill Junction* (up) .. .. | 1.8 |
| PORTOBELLO .. .. .. | 3.0 |

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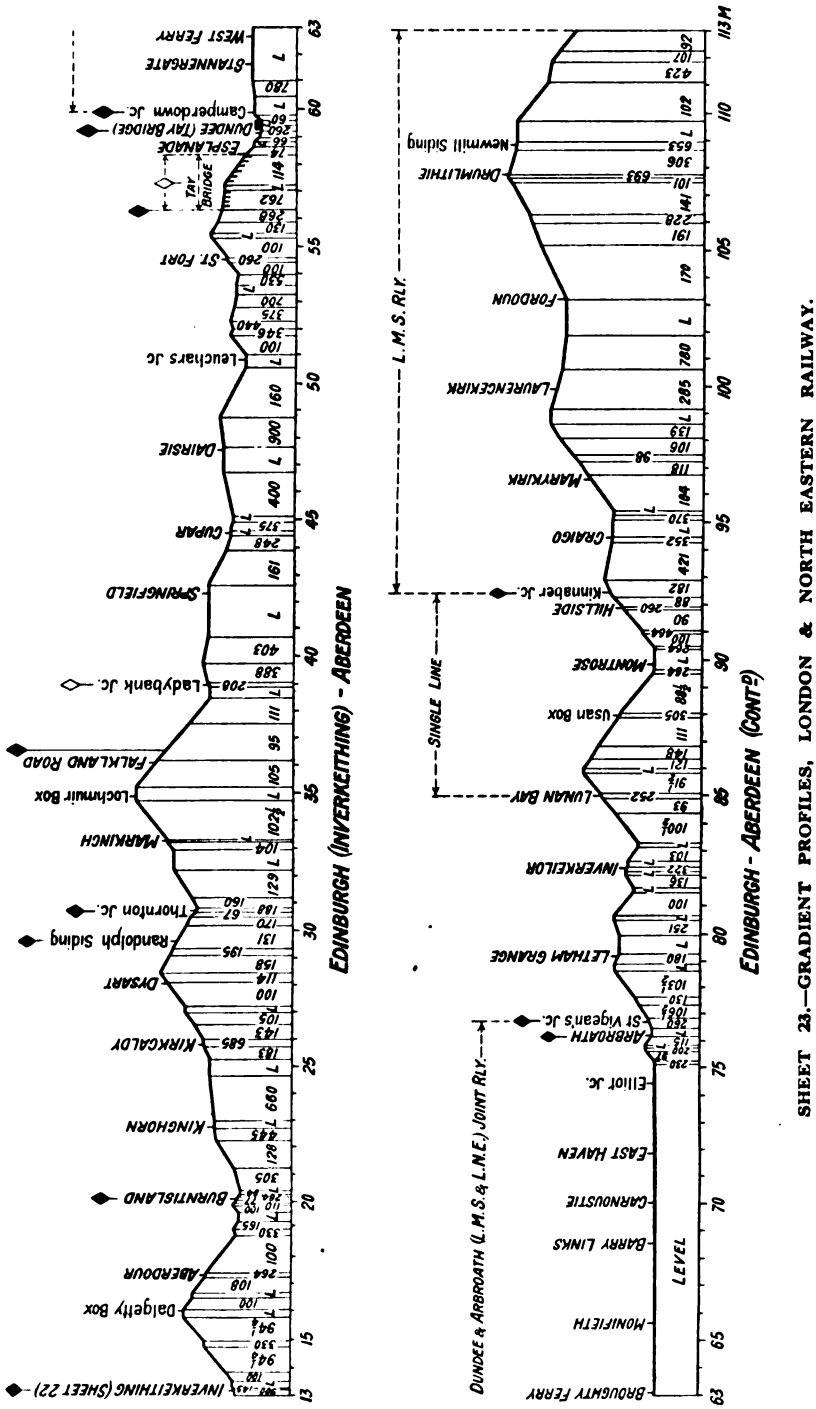


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| | Miles. |
|---|---|
| *Niddrie North Junction* (down) | 3.9 |
| *Niddrie South Junction* (down) | 4.4 |
| Millerhill | 6.2 |
| Eskbank | 8.0 |
| *Hardengreen Junction* (down) | 8.3 |
| Newtongrange | 9.7 |
| *Lady Victoria Pit* (down) | 10.3 |
| Gorebridge | 12.0 |
| Fushiebridge | 12.8 |
| *Borthwick Bank* (down) | 14.1 |
| Tynehead | 16.0 |
| *Falahill* (up) | 17.9 |
| Heriot | 19.1 |
| Fountainhall | 22.6 |
| Stow | 26.7 |
| Bowland | 29.8 |
| *Kilnknowe Junction* (down) | 32.5 |
| GALASHIELS | 33.5 |
| *Selkirk Junction* (down) | 34.5 |
| Melrose | 37.2 |
| *Ravenswood Junction* (up) | 39.2 |
| ST. BOSWELL'S JUNCTION | 40.6 |
| Belses | 45.2 |
| *Standhill Siding* (no signal-box) | 46.7 |
| Hassendean | 48.5 |
| HAWICK | 52.8 |
| *Stobs Camp* (up) | 55.3 |
| Stobs | 56.7 |
| Shankend | 59.8 |
| *Whitrope Siding* (up) | 63.7 |
| RICCARTON JUNCTION | 65.9 |
| Steele Road | 69.4 |
| NEWCASTLETON | 74.0 |
| Kershope Foot | 77.1 |
| Penton | 81.6 |
| Riddings Junction | 84.1 |
| Scotch Dyke | 86.3 |
| LONGTOWN JUNCTION | 88.6 |
| Lyneside | 91.6 |
| Harker | 93.6 |
| *Canal Junction* (down) | 96.9 |
| *Port Carlisle Branch Junction* (up) | 97.4 |
| CARLISLE | 98.2 |

**Edinburgh (Waverley) to Glasgow (Queen Street (Sheet 22).**

*Mile-posts, up side, Saughton Junction to Queen Street (zero).*

| | Miles. |
|---|---|
| EDINBURGH (WAVERLEY) | 0.0 |
| HAYMARKET | 1.2 |
| *Haymarket West Junction* (down) | 2.3 |
| *Saughton Junction* (up) | 3.5 |
| Gogar | 5.5 |
| Ratho | 8.2 |
| *Broxburn Junction* (down) | 10.8 |
| Winchburgh | 12.0 |
| *Winchburgh Junction* (up) | 12.6 |
| Philpstoun | 14.5 |
| LINLITHGOW | 17.6 |
| Manuel | 19.8 |
| POLMONT | 22.3 |
| *Redding* (up) | 23.6 |
| FALKIRK (HIGH) | 25.5 |
| Bonnybridge | 28.8 |
| *Greenhill Upper Junction* (down) | 30.0 |
| Castlecary | 31.7 |
| Dullatur | 34.4 |
| Croy | 35.8 |
| *Waterside Junction* (down) | 39.0 |
| LENZIE JUNCTION | 41.0 |
| Bishopbriggs | 44.0 |
| *Cowlairs West Junction* (up) | 45.4 |
| Cowlairs | 45.7 |
| GLASGOW (QUEEN STREET) | 47.3 |

**Edinburgh (Waverley) to Perth (Sheet 23).**

*Mile-posts, down side, Waverley (zero) to Hilton Junction.*

| | Miles. | |
|---|---|---|
| EDINBURGH (WAVERLEY) | 0.0 | |
| HAYMARKET | 1.2 | |
| *Haymarket West Junction* (down) | 2.3 | |
| *Saughton Junction* (up) | 3.5 | |
| Turnhouse | 6.5 | |
| GLASGOW (QUEEN STREET) | Miles. 0.0 | |
| *Winchburgh Junction* | 34.7 | |
| *Dalmeny North Junction* (up) | 39.1 | 9.1 |
| DALMENY | 39.5 | 9.5 |
| North Queensferry | | 11.3 |
| INVERKEITHING | | 13.2 |
| Rosyth Halt | | 14.6 |
| DUNFERMLINE (LOWER) | | 16.9 |
| *Touch South Junction* (up) | | 18.0 |
| Halbeath | | 19.1 |
| Crossgates | | 20.6 |
| *Cowdenbeath South Junction* (up) | | 21.5 |
| Cowdenbeath (New) | | 22.5 |
| Kelty | | 24.7 |
| Blairadam | | 26.9 |
| KINROSS JUNCTION | | 30.5 |
| Milnathort | | 31.6 |
| Mawcarse | | 34.2 |
| Glenfarg | | 37.6 |
| Bridge of Earn Junction | | 44.2 |
| *Hilton Junction* (down) | | 45.7 |
| PERTH | | 47.7 |

**Edinburgh (Waverley) to Aberdeen (Sheets 22–24).**

*Mile-posts, down side, Waverley (zero) to Dundee, and down side Camperdown Junction (from zero at Dundee East) to Kinnaber Junction; thence down side, Caledonian (L.M.S.) mile-posts (from zero at Carlisle) to Aberdeen.*

| | Miles. |
|---|---|
| EDINBURGH (WAVERLEY) | 0.0 |
| as Edinburgh-Perth table (above) to:— | |
| INVERKEITHING | 13.2 |
| *Dalgetty* (down | 16.1 |
| Aberdour | 17.4 |
| BURNTISLAND | 20.1 |
| Kinghorn | 22.7 |
| *Invertiel Junction* (down) | 24.8 |
| KIRKCALDY | 25.9 |
| Sinclairtown | 27.3 |
| Dysart | 28.0 |
| *Randolph Siding* (down) | 29.6 |
| THORNTON JUNCTION | 30.7 |
| Markinch Junction | 33.3 |
| *Lochmuir* (down) | 34.9 |
| Falkland Road | 36.1 |
| Kingskettle | 38.2 |
| LADYBANK JUNCTION | 39.1 |
| Springfield | 42.3 |
| Cupar | 44.6 |
| Dairsie | 47.6 |

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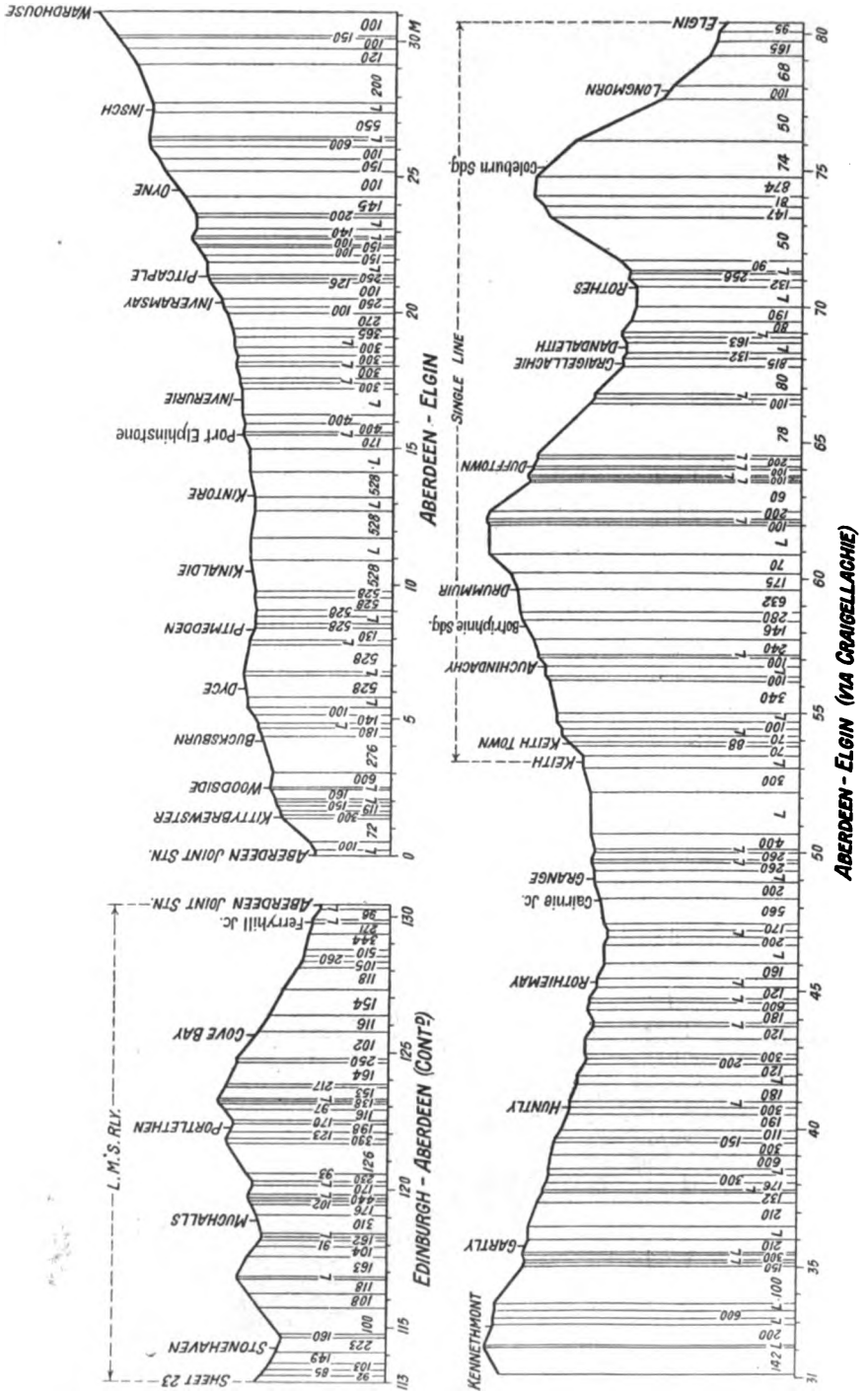


SHEET 24.—GRADIENT PROFILES, LONDON & NORTH EASTERN RAILWAY.

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| | Miles. |
|---|---|
| LEUCHARS JUNCTION .. .. | 50.9 |
| St. Fort .. .. .. .. .. | 54.6 |
| *Tay Bridge South* (up) .. .. .. | 56.5 |
| Esplanade .. .. .. .. | 58.4 |
| DUNDEE (TAY BRIDGE) .. .. | 59.2 |
| *Camperdown Junction* (down) .. .. | 59.9 |
| Stannergate (closed) .. .. .. | 61.7 |
| West Ferry .. .. .. .. | 62.7 |
| Broughty Ferry .. .. .. | 63.2 |
| Monifieth .. .. .. .. | 65.6 |
| Barry Links .. .. .. .. | 68.5 |
| Carnoustie .. .. .. .. | 70.1 |
| East Haven .. .. .. .. | 71.9 |
| Elliott Junction .. .. .. | 74.8 |
| ARBROATH .. .. .. .. | 76.2 |
| *St. Vigeans Junction* (up) .. .. | 76.8 |
| Letham Grange .. .. .. .. | 79.2 |
| Cauldcots .. .. .. .. | 81.1 |
| Inverkeilor .. .. .. .. | 82.4 |
| Lunan Bay .. .. .. .. | 85.0 |
| *Usan* (up) .. .. .. .. | 87.8 |
| MONTROSE .. .. .. .. | 89.9 |
| *Kinnaber Junction* (down) .. .. | 92.5 |
| Craigo .. .. .. .. .. | 94.6 |
| Marykirk .. .. .. .. | 96.7 |
| LAURENCEKIRK .. .. .. | 99.9 |
| Fordoun .. .. .. .. | 103.2 |
| Drumlithie .. .. .. .. | 107.2 |
| Carmont .. .. .. .. | 108.9 |
| STONEHAVEN .. .. .. | 114.4 |
| Muchalls .. .. .. .. | 118.9 |
| Newtonhill .. .. .. .. | 120.1 |
| Portlethen .. .. .. .. | 122.3 |
| Cove Bay .. .. .. .. | 125.7 |
| *Ferryhill Junction* (down) .. .. | 129.9 |
| ABERDEEN .. .. .. .. | 130.5 |

**Aberdeen to Elgin via Craigellachie (Sheet 24).**

*Mile-posts, down side, Aberdeen (zero) to Elgin.*

| | Miles. |
|---|---|
| ABERDEEN .. .. .. .. | 0.0 |
| Schoolhill .. .. .. .. | 0.4 |
| Kittybrewster .. .. .. .. | 1.4 |
| Woodside .. .. .. .. | 2.6 |
| Bucksburn .. .. .. .. | 4.1 |
| DYCE .. .. .. .. .. | 6.3 |
| Pitmedden .. .. .. .. | 8.3 |
| Kinaldie .. .. .. .. | 10.6 |
| Kintore .. .. .. .. .. | 13.4 |
| *Port Elphinstone* .. .. .. | 15.6 |
| INVERURIE .. .. .. .. | 16.9 |
| Inveramsay .. .. .. .. | 20.4 |
| Pitcaple .. .. .. .. .. | 21.4 |
| Oyne .. .. .. .. .. | 24.6 |
| Insch .. .. .. .. .. | 27.6 |
| Wardhouse .. .. .. .. | 31.1 |
| Gartly .. .. .. .. .. | 35.8 |
| HUNTLY .. .. .. .. | 40.8 |
| Rothiemay .. .. .. .. | 45.3 |
| Cairnie Junction .. .. .. | 48.2 |
| Grange .. .. .. .. .. | 49.0 |
| KEITH .. .. .. .. .. | 53.3 |
| Keith Town .. .. .. .. | 53.8 |
| Auchindachy .. .. .. .. | 56.7 |
| Drummuir .. .. .. .. | 59.6 |
| Dufftown .. .. .. .. | 64.0 |
| CRAIGELLACHIE .. .. .. | 67.8 |
| Dandaleith .. .. .. .. | 68.4 |
| Rothes .. .. .. .. .. | 70.6 |
| *Coleburn Siding* .. .. .. .. | 75.0 |
| Longmorn .. .. .. .. | 77.3 |
| ELGIN .. .. .. .. .. | 80.4 |

*Photo.*] GREAT SOUTHERN RAILWAYS IRELAND. [*A. H. K. Roberts.*

**2**-6-2T No. 850 passing Glenageary.

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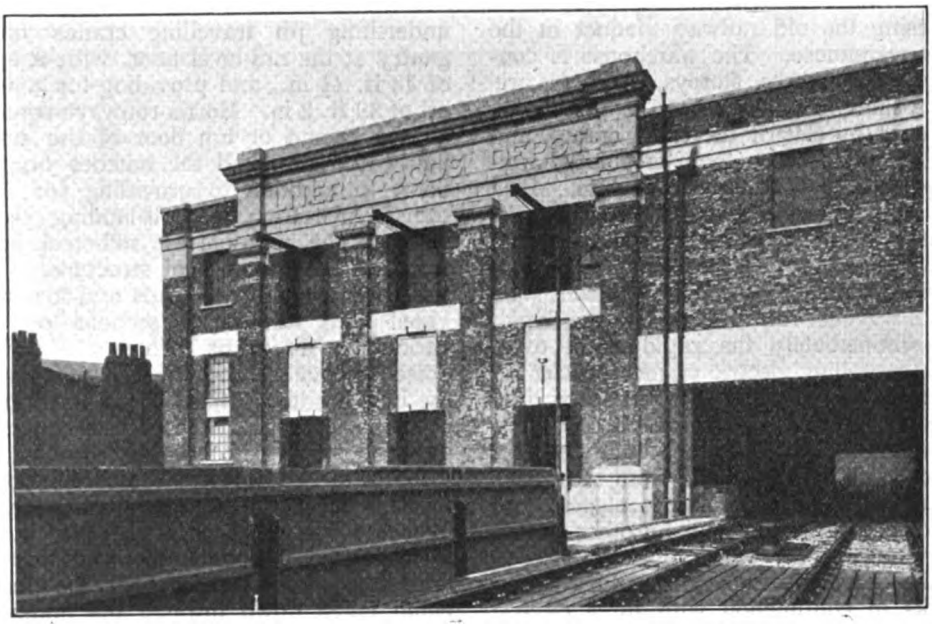

VIEW OF NEW WAREHOUSE FROM RAIL LEVEL.

# East Smithfield Depôt, L.N.E.R.

IN view of the large amount of Danish bacon handled by the London and North Eastern Railway, hitherto dealt with at the Bishopsgate and Royal Mint Street Goods Depôts, and with the idea of concentrating the bacon import and providing for its handling and storage on the most hygienic and modern lines, whilst at the same time releasing accommodation at the existing goods stations for other traffics, the London and North Eastern Railway has erected on freehold property, in close proximity to the Royal Mint Street Depôt, a specially equipped warehouse, to be known as East Smithfield Depôt, which will receive the bacon supplies previously passing into Bishopsgate, and later probably also those now passing to Royal Mint Street. The site of the depôt has been selected for convenience of distribution. It is in East Smithfield, in close proximity to the Tower of London, Tower Bridge and Tooley Street, and equally convenient for serving South London and the Central Meat Market district *via* the main thoroughfares. The new depôt is also in close proximity to Goodman's Yard and within easy reach of Fenchurch Street Station.

Railway communication direct from Parkeston is available right into the depôt, and the connection with the main line is by means of a short double-line branch railway exclusively devoted to the requirements of East Smithfield. Formerly the site of the new warehouse was occupied by a small single-storey goods depôt into which railway wagons were lowered by means of an hydraulic wagon hoist from the railway lines on the viaduct above. There was accommodation in the depôt for 26 wagons, served by cart roads and unloading stage, whilst one section was occupied by a small storage warehouse.

In order to provide a sorting and storage area, the whole of the ground floor has been utilised as an unbroken receiving floor. The railway wagons are discharged whilst standing on the viaduct, there being an auxiliary sorting and storage floor level with the trucks on the viaduct, together with a second storey



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encasing the old railway viaduct in the new warehouse. The warehouse is constructed in three storeys. There are three lines of railway on the first floor, spanned by electric travelling cranes, and in the third storey there is a large runway-track system by means of which additional electric transporters may discharge from the trucks and pass the load into the required position on the second, first or ground floor. Trains, consisting of 28 wagons, run directly into the depôt, and immediately the rapid-action overhead travelling electric cranes transfer the bacon from the trucks on the three lines to the lower ground floor for sorting, storage or delivery. Simultaneously, bacon may be discharged from the trucks directly to the adjoining stages and lowered to the main floor by other travelling cranes or an electric hoist.

The overhead track on the third storey works in conjunction with three electric jiggers or extending electric cranes for direct transfer from truck or upper storage floors to road vehicles standing outside the warehouse, thus providing a useful auxiliary means of delivery. The former railway wagon hoist between the rail level and the ground floor has been converted into a 30-cwt. electric goods lift for handling traffic between the east side of the first floor and the ground floor. For the first time, steel shaped copings are being fixed to the well openings, all of which are efficiently protected on two sides by stout tubular railings and by detachable chain guards on the others. The whole of the lighting is electric, with dispersive fittings, and all handling machinery in the warehouse is operated by electricity. The depôt has been constructed to the designs and under the supervision of Mr. C. J. Brown, Engineer, Southern Area, London and North Eastern Railway.

There are five 1-ton fixed bollard electric capstans designed for a speed of 200 ft. per min. Two of these capstans are placed at the East Smithfield end of the warehouse and three outside in the direction of Leman Street. All are on the viaduct. There is also a 30-cwt. goods lift, with Bostwick gates at all landings and on the cage, and two 30-cwt. underslung jib travelling cranes on a gantry at the rail-level floor, with a span of 48 ft. 1½ in., and providing for a total lift of 39 ft. 2 in. Morris runways operate on the second or top floor of the warehouse and serve all the hatches on this floor, in addition to providing for load transference from the self-landing jigger hoists. The runways are roll-steel joists suspended from the roof structure. The joists carry conductor leads and are provided with turn-switch sections on the various run directions. Three self-landing hoists operate at and through portals on the East Smithfield front of the warehouse over the van yard. The hoists comprise a winch suspended from the roof structure, with a runway beam extending through the portal and giving an outreach over the van yard of 6 ft. The hoists are operated by hand chains on top or third floor and on the first floor, the chains being taken down through the floors to give this facility. A travelling jenny runs on the extended beam and gives the self-landing feature.

The formal opening by His Excellency the Danish Minister, Count Preben Ahlefeldt-Laurvig, took place on April 29 last in the presence of a number of guests representative of Anglo-Danish trading interests and a number of directors and officers of the London and North Eastern Railway Company. Colonel William Johnson Galloway presided at a luncheon, which was held at the Great Eastern Hotel, Liverpool Street Station, following the opening ceremony.

In the course of the proceedings, Count Preben Ahlefeldt-Laurvig said:—"I am most happy to mention that my King has shown his appreciation of the London and North Eastern Railway for all they have done to promote and facilitate the import of Danish goods by conferring upon Colonel Galloway the insignia of the Commandership, First Degree of the Order of Dannebrog; on Sir Ralph Wedgwood the insignia of the Commandership, Second Degree of the Order of Dannebrog; on Mr. Alexander Wilson the insignia of the Knighthood of the Order of Dannebrog; and on Mr. A. L. Gibson the insignia of the Knighthood of the Order of Dannebrog."

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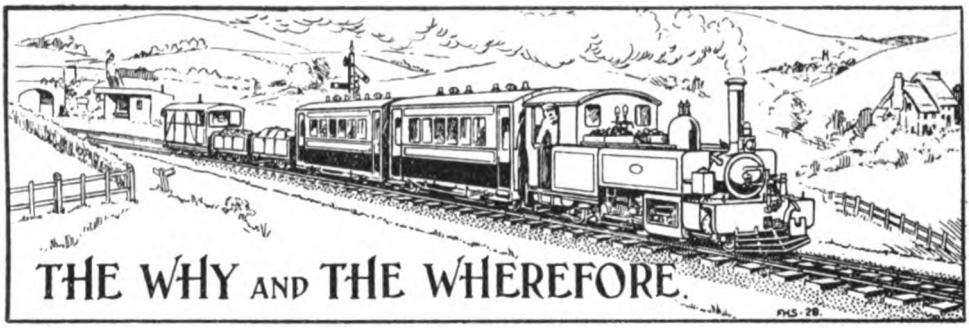

# THE WHY AND THE WHEREFORE.

*RAILWAY MAGAZINE readers desiring information should mark envelopes "Query" in the upper left-hand corner, and address them to the Editor. Questions relating to the dimensions and weights of railway rolling-stock and to names, numbers, dates, &c., of locomotives should not be forwarded. No reader should send more than two questions in one month. Correspondents are requested to write on one side of the paper only, and although they must give their names and addresses, pen-names or initials may be inserted for Editorial use. Before asking for information concerning railway history or "grouping," the pages of the "Railway Year Book" (5s. net) should be consulted. The thirty-first Annual Edition (1928) of this standard railway reference work is now published. All previous Editions are out of print.*

### L.N.E.R. "Pacifics."

The Raven "Pacifics" and the Gresley "Pacifics" were tested against each other between London and Doncaster in exactly the same way as the latter were subsequently tested against the Great Western Railway "Castles" at a later date, though we should hesitate to describe either test as "exhaustive." The choice of the Gresley "Pacific" in place of the North Eastern Railway type as the London and North Eastern standard for the heaviest express work is in line with the normal policy of concentrating on one standard of construction as far as possible, and especially on standard parts, which are to a large degree interchangeable in the various Doncaster designs. For the answer to your other hypothetical query you should study *British Locomotive Practice and Performance.*

[Reply to "CITY OF NEWCASTLE."]

### Unusual Wheel Arrangements.

We cannot recollect that any engines of more or less usual types have had the wheel arrangement 6-2-0, 6-4-0 or 6-6-0. There have, however, been a few unusual engines which approximate to these. For example, we would call to mind a Bavarian engine, built many years ago, which had a single pair of booster-driven driving wheels between those of the bogie, which would thus account for six wheels in the leading group. One or two of the Crampton engines, too, may have had six wheels in front of the driving wheels. Particularly in America there have been tank engines with a six-wheeled bogie, though this has usually been under the bunker. We cannot, however, specify any engines which directly have the wheel arrangement mentioned by you.

[Reply to "BOWDEN HALL."]

### Branch Train Workings.

It is not unusual, on all lines, for trains to make composite journeys, including branches and sections of main routes, and presumably the Southern Railway instances noted by you are of this class. Sometimes a given engine and set will thus work from A to B, B to C, C to D, D to E, and then perhaps back to A indirectly instead of keeping to a given branch or section, and thus may introduce many interesting features as in the cases mentioned by you. Thanks for notes as to the composition of the Margate-Bournemouth and Birkenhead trains. We cannot explain the peculiar working of the restaurant car, nor can we state, without enquiry, the formations of the various sections of the trains indicated.

[Reply to C. TAYLOR.]



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**Driving-wheel Diameter.**

Reducing the diameter of driving wheels obviously increases the tractive effort, and it is for this reason that most British railways have built smaller-wheeled versions of their express passenger types (*e.g.*, the G.W. "Hall" variant of the 4-6-0 "Saints," the Southern 5-ft. 7-in. 4-6-0 engines, otherwise of "King Arthur" dimensions, &c.) for express-freight service at lower than the ordinary passenger speeds. The smaller-wheeled engines can, if necessary, be driven at speeds closely approaching the maxima attained by those with the larger wheels, but the motion speeds so entailed are undesirable, from the wear-and-tear point of view.

[Reply to E. JOSLIN.]

**Longest distance between Signal Boxes.**

There must be examples, on the West Highland line of the L.N.E.R., the Highland section of the L.M.S.R., and here and there elsewhere, of several miles between signal-boxes, but the settlement of your enquiry is not worth the research necessary. There are often gate-houses and sometimes intermediate boxes, but as a rule the longest distances are those separating crossing-places on single lines, allowing for boxes at any intermediate non-crossing stations or sidings if not covered by a ground-frame controlled by the staff or tablet. Marylebone Station was described in the October, 1911, issue of the RAILWAY MAGAZINE.

[Reply to ANTHONY GORBEN.]

**Locomotive Classification, G.W.R.**

The comprehensive locomotive classification of the G.W.R., of which external indication is given by a letter in the centre of a coloured circle on the cab side-sheet of each engine, covers both the routes over which the engines may run and also the graded power classification governing the loads that the engine may handle over each section. The colour of the circle indicates what section or sections the engine may work over, or, alternatively, those from which it is "barred" by reason of weight or external dimensions, and the letter the power "group" to which the engine belongs.

[Reply to "INVICTA."]

**"Siphon G" Wagons, G.W.R.**

"Siphon G" is one of the various designations used by the Great Western Railway for ready distinction of different classes of wagons. "Siphon" indicates the class, in this case a "box" or covered goods wagon, and "G" the particular type or size. The actual names have in themselves no meaning, but have been chosen in order to reduce to a minimum any risk of confusion in writing or telegraphing. "Macaw" (bolster wagons, with seven subdivisions, A, B, C, D, E, F and G) and "Crocodile" are other familiar titles.

[Reply to J. UNITE.]

**Signal Boxes on Scottish Branches.**

Block posts between Whitburn and Castlehill Branch Junction, on the Morningside branch of the London and North Eastern Railway, are Addiewell Junction, Bents, Longridge, Fauldhouse and Crofthead, Knowton, Blackhall, and Duntie. We have no corresponding details in regard to the London, Midland and Scottish section from Greenhill to Bonnybridge.

[Reply to "LUTHRIE."]

**A Signalling Query.**

The reply previously given was written by a well-known signalling engineer, and if it does not seem to be correct we can only assume that he did not word it as clearly as you would wish or that he described procedure in broad terms without specifying every detail.

[Reply to R. M. CLARKE.]

**Early Great Eastern Locomotives.**

The Bromley 4-2-2-type express engines of this railway, built between 1879 and 1882, were scrapped at various dates between 1890 and 1893. The Worsdell 4-4-0 engines, built as two-cylinder compounds in 1884-5 and converted to simples in 1892, were scrapped in 1902-4.

[Reply to E. H. JOSLIN.]

**Frontispieces and Coloured Plates.**

Your suggestion will be borne in mind. Large colour-plates are much too expen-

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sive to be issued at frequent intervals. As soon as there is sufficient justification, and with further new engines of special interest calling for this attention, further ones will be put in hand.

[Reply to " CONSTANT READER."]

**5.15 p.m. Bristol-Paddington, G.W.R.**

The actual time at which this express is booked to pass Swindon is 6.2 p.m., and the passing time of 6.39 p.m. at Reading therefore leaves 37 min. for covering the 41¼ miles between the two towns. The reason why the slip arrival at Swindon is shown in the time-tables is because the slip is detached on the centre road west of the station, a shunting engine then bringing the coach to the platform, for which operation the allowance is 3 min. At Reading the express is looped to the platform road in order to slip, and for this purpose has to reduce speed. We note your possible connections from Manchester to Milford.

[Reply to J. W. DORLING.]

**Upper Quadrant Signals.**

There are several advantages attending the use of upper quadrant signals, whether power or mechanically operated. For one thing, the weight of the arm itself ensures return to the danger position when released or in the event of failure, thus saving the heavy counterweights ordinarily necessary. It is also thought by some authorities that upper quadrant signals are more easily observed.

[Reply to R. HALKETT, JR.]

**Signal-boxes on G.E. Section, L.N.E.R.**

Block signal-boxes on the Ipswich main line of the L.N.E.R., in sequence from Bethnal Green Junction to Stratford, are Bethnal Green East Junction, Devonshire Street (country end of Devonshire Street Station, now closed), Canal, Coborn Road Station, Bow Junction, Bridge, Stratford Western Junction and Stratford Central Junction.

[Reply to " LIVERPOOL STREET."]

**0-6-0 Locomotives, L.M.S.R.**

Except for a few minor improvements, the L.M.S.R. 0-6-0 locomotives are practically identical with the latest engines of the same class employed on the Midland Railway prior to grouping.

[Reply to W. A. SPURR.]

**City and South London Railway.**

Opened in December, 1890, this line, the " first electric tube railway in the world," has never used steam locomotives. Electric locomotives were used until the line was reconstructed a few years ago.

[Reply to E. B. CARPENTER.]

**Gradient Problems, &c.**

We cannot answer queries as to gradients in branch lines other than those considered in the articles now running. Four-track, except for goods loops, ceases on the G.E. Cambridge route of the L.N.E.R. at Hackney Downs.

[Reply to T. W. LONSELL.]

**Chimney Dampers on Continental Locomotives.**

Many Continental locomotives, particularly older ones, have a hinged damper plate which can be turned to cover the tops of the chimneys while in the sheds.

[Reply to W. P. CONOLLYS.]

**Sapperton Tunnel, G.W.R.**

Sapperton Tunnel of the Great Western Railway pierces the Cotswold Hills between Kemble and Chalford, on the old South Wales main line from Swindon to Gloucester.

[Reply to " INVICTA."]

**DX Locomotives, L.N.W.R..**

Of these famous engines, No. 8084 is still in service, but No. 8064 was scrapped in 1928. Of the original 942 engines, only Nos. 8029, 8051, 8058, 8060 and 8084 are now in service.

[Reply to " GENERAL."]

**" Dual-Fitted " Stock.**

This indication on railway vehicles is to show that they are fitted with both the Westinghouse and the Vacuum automatic brakes.

[Reply to J. UNITE.]

**Hinged Plates for Buffer Stops.**

Hinged iron plates mounted over the buffers at terminal stations are provided to enable road vehicles to be placed in or drawn from carriage trucks endways.

[Reply to W. P. CONOLLYS.]

**Cambridge Station, L.N.E.R.**

The exact present length of the main platform at Cambridge is 1,677 ft.

[Further reply to H. VYVYAN.]

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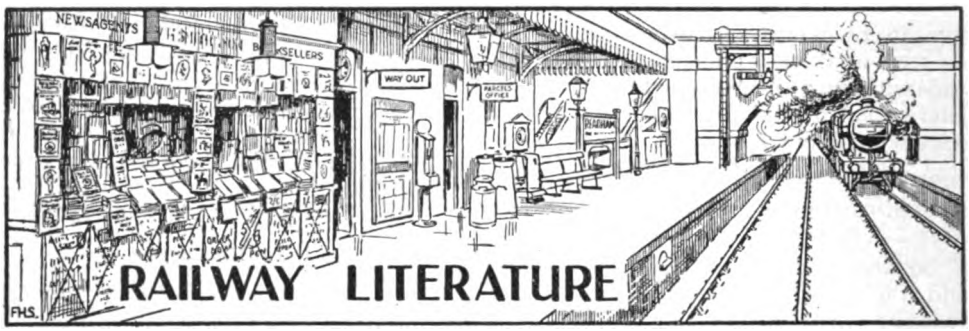


RAILWAYS OF TO-DAY: THEIR EVOLUTION, EQUIPMENT AND OPERATION. By Cecil J. Allen. [Frederick Warne and Co., Ltd. Price 12s. 6d. net, by post 13s.] (Copies can be obtained at the offices of THE RAILWAY MAGAZINE, 33, Tothill Street, Westminster, London, S.W.1.)

To readers of THE RAILWAY MAGAZINE Mr. Allen needs no introduction, and we can hardly imagine any who will not wish to add this volume to their railway libraries, especially as it may be regarded as the culminating work of the now lengthy series for which Mr. Allen has been responsible. Although an unusual size is adopted—pages 6½ inches long and 4½ inches wide—by using a medium-sized but comfortably readable type a very wide range of subject-matter and material is covered in 400 pages, while it is claimed, with justice, that the series of 200 half-tone illustrations, 25 diagrams and drawings, and 36 views in colour, with a "complete sectional chart of a modern express locomotive," constitute "the finest collection of railway pictures ever yet got together within the covers of a book of this character." Many of the colour views break away from the selections usual in popular books dealing with railways, and a number deal with foreign lines. All are well produced and printed. The folding locomotive chart, equal to four pages, shows a L.N.E.R. 4-6-2 engine, and has a reference table of every part. A good feature is the inclusion of references in the text to plate numbers. The selection of photographic views is very good, including unusual items and striking pictures to a notable degree. We appreciate incidental acknowledgments to THE RAILWAY MAGAZINE. The volume is well bound in substantial red covers, the front with an embossed view in gold of a L.N.E.R. 2-8-2 engine, while a "wrapper" shows, in colour, a Sentinel-Cammell rail car.

Dealing now with the text, Mr. Allen has adopted the system of parts—I, The Track; II, The Motive Power; III, The Trains; and IV, Railway Operation; with 11 Appendices and a very full Index. Each part has five chapters, but these are numbered continuously. Chapter I is a rapid survey of "A Century of Railway Development," touching upon pre-locomotive railways, early engines, principal landmarks in railway and locomotive history, essential statistics and general matters of interest. Obviously no attempt could be made to cover this phase completely, but Mr. Allen has selected his material very carefully and suitably. Chapter II, "Planning the Route," discusses the laying out of railways and problems involved, such as gradients, tunnels, bridges, etc. Chapter III considers "The Choice of Gauge," with particulars of railway gauges throughout the world. Chapter IV is concerned with "Bridging and Tunnelling," and Chapter V with "The Permanent Way." Chapters in Part II deal with Steam Locomotive Types and Classes, Cylinders and Motion, The Boiler and the Fuel, and At the Shed and on the Road, with one on Electric Traction. Part III similarly covers Passenger Classes and Coaches, Express Passenger Services, Branch and Cross-Country Services, Suburban and Electric Services, and Freight Trains; while Part IV discusses and explains Timetables and Traffic Control, Stations and Their Staffs, Signals and Signalling, "Some Other Railway Activities, and Administration."

It will thus be seen that a very complete range of subject-matter is covered, and throughout Mr. Allen has performed his task of describing how and why this or that is done, and explaining main considerations in locomotive construction and operation, permanent-way design and maintenance, train working, signalling, etc., etc., with great clarity and avoidance of unnecessary technicalities. Incidentally he conveys a great deal of interesting information and gives many facts which will be useful for reference purposes. The appendices give data (in some cases amplified beyond the usual sources of reference)



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on Highest Altitudes on British Railways, The World's Highest Railway Summits, The Longest Railway Tunnels in the World, Longest British Railway Tunnels, Locomotive Wheel Arrangements, Leading Dimensions of Principal British Express Locomotive Types, Longest Daily Non-Stop Railway Runs in Great Britain, Fastest Daily Railway Runs in Great Britain and France, Longest Daily Non-Stop Runs in France, and Largest Signal-Boxes in Great Britain.

As it is supposed to be one of the duties of a reviewer to indicate a few shortcomings on the part of an author, we may point out that "reversible" working no longer applies to the South London line from London Bridge, S.R.; while the Bournemouth line head code, on the same system, is not now as described. These are, however, quite minor points, and as a whole we must congratulate Mr. Allen upon the interesting way he has written, the completeness with which he has covered his ground, the valuable data included, and the valiant attempt he has made to give statistics on points such as highest altitudes of world's railways, as to which writers do not always agree.

LOCOMOTIVES OF THE L.N.E.R., PAST AND PRESENT. [The Locomotive Publishing Co., Ltd., by arrangement with the L.N.E.R. Price 1s.]

This booklet, copies of which can be obtained at L.N.E.R. stations, town offices and elsewhere, will be welcomed by all who are interested in the locomotives of the L.N.E.R. The cover shows one of the "Pacifics" in colour, while the text includes a detailed description of this class of engine with reference to corridor tenders, general notes on the renumbering and naming of L.N.E.R. locomotives and trains, and views of various locomotives, starting with the Stockton and Darlington *Locomotion* and proceeding through the century to the latest classes, some of the engines being shown in small views and others as complete pages, with dimensions and descriptive particulars. Views are also included of Sentinel-Cammell and Clayton rail cars. Altogether there are 33 photogravure illustrations of locomotives and trains. The booklet concludes with some interesting facts in regard to the L.N.E.R. and lists of L.N.E.R. named locomotives arranged in classes, together with particulars of the named expresses running on this line.

OVER A CENTURY OF RAILROADING. The National City Company, of 34, Bishopsgate, London, E.C.2, send a booklet, titled as above, issued by the Baltimore and Ohio Railroad, "America's First Railroad: Established 1827." The historical section includes some interesting old pictures, while further sections are headed "Territory served by the B. and O. and Traffic Derived Therefrom"; "Upbuilding the Railway Plant" (with statistics, &c.); "Operating Efficiency" (locomotives and shops); "Earning Power"; "Capitalisation and Financial Condition"; and "A Comparison with other Large Systems." Within about 30 pages, interesting information is given, with a number of illustrations.

THE PORT OF BRISTOL, 1929. This handsome handbook consists of 106 pages, and an advertisement section, enclosed in a cover of simple but effective design, and is published under authority by F. G. Warne Limited, 30, Baldwin Street, Bristol. It is printed throughout on fine art paper and contains numerous half-tone illustrations and a number of folding maps and plans. The reading matter is clearly printed and well arranged, and the page devoted to the history of Bristol—a history of two thousand years—is not the least interesting feature of the handbook.

THE Locomotive Publishing Co. Ltd. send a dark brown wall card, 11 in. sq., to which is attached a fine photographic view of the "Flying Scotsman" (L.N.E.R.), whilst beneath is a tear-off monthly calendar in maroon and white. The published price is 2s. 3d., post free.

CHARLES GRIFFIN & CO. LTD., the well-known technical publishers, of 42, Drury Lane, London, W.C., send a copy of their spring list of newly-published books. Details will be sent on request; also of older works dealing with railway and locomotive engineering.

THE Westinghouse Brake & Saxby Signal Co. Ltd. send a small desk calendar, measuring 4¼ in. by 7¼ in., to which are attached two tear-off tablets—one of the months and one of the days—the latter printed in red and black.

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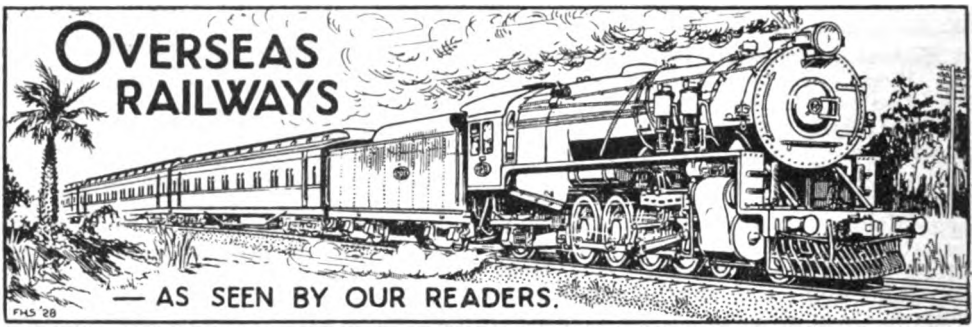


*Correspondence for this section, with or without photographs, is invited.*

### Indian Railway Developments.

In the new time-table of the East Indian Railway, coming into force on April 1, I notice that, in addition to the branch I wrote about lately, Sentinel Coaches are being introduced on three routes, and "Rail Omnibuses" (engine and one or two third-class coaches) on three more, while "Light Trains" (engine and about three coaches of all classes) are being brought into use on two lines. For the most part these have extra halts as well as the ordinary stations, in view of motor-'bus competition. Additional services of the kind are announced in advance. —[Rev. W. Machin.]

### Notes on Travel in Austria.

I travelled from Bâle to Feldkirch, via Zurich, by electric train. Thence to Innsbruck, in the Tyrol, on the Austrian State Railways. Two electric locomotives took us to the summit of the Arlberg tunnel. The Austrian railways seem in good condition, and the trains, if not very fast, are at least punctual. The second class are very good. The third class (express stock) are not as good as some of the third (express) on the Est or Orleans in France. If a passenger travels third by slow train, it is certainly at about ½d. or less per mile—but third by express, and certainly second, is very little less than our third. I found the officials in Germany (Bavaria) and Austria very polite and obliging, and the Customs very lenient. In fact, coming from Vienna to Nuremberg, my luggage was not examined on the frontier, and one had only to exhibit the outside of the passport. Going to Vienna via Calais-Laon-Bâle-Zurich-Feldkirch-Salzburg, the Swiss, French and Austrian Customs and passport authorities were also very reasonable. I mention this for the sake of people wishing to go to Austria, a most beautiful country, who know little or no German and are afraid of unpleasantness. —[P. A. Curtois.]

### Notes on the Paris-Orleans Railway.

During the war, the Americans double-tracked the former single line through the town of Nantes (Loire Inf.), between the Gare d'Orleans and Chantenay. At the present time, owing to the serious dislocation of road traffic at the numerous level crossings, it is proposed to carry this piece of line over a viaduct between the two stations. That arm of the river running between the Gare de la Bourse, at the western end of the town, and the Gare d'Orleans, at the eastern, is now being filled in, and over the land thus created the new viaduct will, in the fullness of time, arise. Incidentally, there are very few towns like Nantes, where you may, for the space of several kilometres, race an express in a tramcar. The tramway and the railway are separated from each other only by the pavement and an iron fence, and the speed of the trains through the town, being restricted to 10 km. per hour, you may, from the (more or less) comfortable seat of a tramcar profitably observe the functioning of Walschaert valve-gear, and other odd reciprocations common to a P.O. locomotive, while running.

### Dutch and Danish Locomotives.

In Mr. Hamilton Ellis's paragraph on Dutch locomotives in the May Railway Magazine is a remark about the Beyer-Peacock 2-4-0's 929, etc., being the oldest passenger engines on the Netherlands Railways at present. This is not the case, as the inside-cylinder 2-4-0's of 1864-66, by the same builders, are still to be seen. They are almost in their original condition, with open driving splashers, but now have cabs and Ramsbottom safety valves. I took a picture of 704 at the Hook recently, and saw 745 in a shed near by. Probably in the more remote parts of Holland several more of the class are to be seen, as there were originally over 70 of the class. They bear striking testimony to the genius of Mr.



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Beyer, as they are very pretty little engines, also to the soundness of design and workmanship.

I enclose a photograph of one of the Danish State Railway's new 2-6-4 tank locomotives, which are used on both fast and slow passenger traffic on the two routes from Copenhagen to Helsingör (Elsinore). Leading dimensions are:—Cylinders (3), 17 in. by 26 in.; coupled wheels, 5 ft. 8 in. diam.; steam pressure, 180 lb. per sq. in.; heating surface, including superheater, 1,795 sq. ft.; grate area, 26 sq. ft.; weight in working order, 92 tons. Twenty of these locomotives (Nos. 721-740) have been built, the first two in 1924 at Borsig's, in Berlin, the remaining eighteen at Frich's, in Aarhus, during 1927 and 1928. As the maximum speed on the Danish State Railways is fixed by law at 90 kms. (56 miles) per hour, no spectacular speeds are ever reached, but still these locomotives perform some very good work. The tractive effort of about 18,000 lb. gives good acceleration and hill-climbing powers. In spite of several long stretches at 1 in 100, the two routes mentioned were the only ones on the island of Sjolland (Zealand) which were not seriously impeded by this winter's exceptional snowfalls. Without doubt, this was partly due to the powerful locomotive described. As an example of the extraordinary winter, it may be mentioned that a train which got stuck in a long snowdrift 14 ft. high and had to be abandoned, was completely buried in the course of the following night! The train consisted of a 2-4-2 tank locomotive and five passenger carriages. The train-ferry service between Zealand and Fyn was for several weeks practically stopped through ice-hindrances, which were supported by an unparalleled series of accidents to nearly all the ferries and ice-breakers on this route. Altogether, this winter has cost the Danish railways a great amount of money. The photograph was taken at Klampenborg, about seven miles north of Copenhagen.—[JAMES STEFFENSEN.]

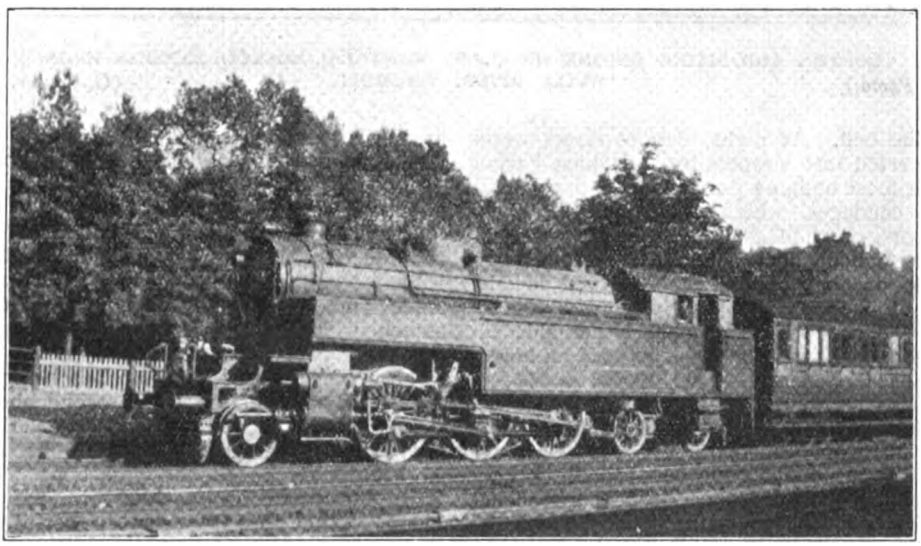

*Photo.*] **2-6-4 TANK ENGINE, DANISH STATE RAILWAYS.** [*J. Steffensen.*

**Railway Experiences.**

SIX months ago I returned from a Canadian and Newfoundland tour under the auspices of the School Empire Tour Committee. We travelled across Canada on the two railways, on the Western trip, Canadian National; on the Eastern trip, Canadian Pacific. The first thing that seemed curious to me was when we were at Quebec (Palais) Station. The train left without so much as a whistle or the waving of a green flag from the guard, as is done in this country. The only warnings were the trainman's shout of "All aboard!" and the clanging of the engine bell. This bell usually rings just before starting, and continues ringing until the train is clear of the level-crossings near the station.

There are very few road bridges in Canada, mostly all level-crossings, without any gates. When about a quarter of a mile from a crossing the engine whistled at intervals, and in busy towns this whistling was accompanied by the clanging of the

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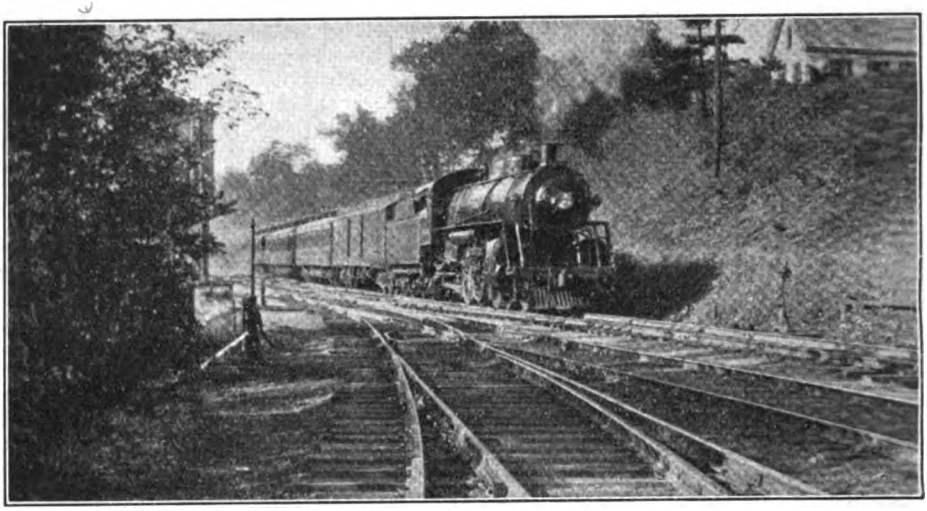

BOSTON AND MAINE ENGINE ON C.P.R. MONTREAL-BOSTON EXPRESS NEAR WELLS RIVER, VERMONT. *Photo.*] [*C. Parker.*

engine bell. At night, day carriages were converted into sleepers by "darkies," who were most obliging porters. Our party had two carriages, which we kept till Prince Rupert, on the C.N.R.; two other carriages from Vancouver to St. John, New Brunswick, on the C.P.R., which served as our diners, sleepers and day coaches. There were two rows of beds on either side of the carriage, having upper as well as lower berths.

About eight of us were lucky enough to travel on the footplate of one of the Temiskaming and Northern Ontario Railway engines, when the train was travelling over 60 m.p.h., and, as unaccustomed travellers, we had to keep a very firm hold. The footplate on a Canadian engine is larger than that on a British engine. The rear part of the boiler extends into the cab; the doors of the furnace open and shut mechanically, thus minimising the work of the stoker. Our trip on the engine lasted from Porquis Junction till Cochrane, a distance of 27.9 miles. The T. & N.O.R. is a branch line of the Canadian National Railways.

We had the novel experience of travelling on a train ferry between Nova Scotia and Cape Breton Island, on the C.N.R. line from Montreal to Sydney. We joined the express at Truro. The Newfoundland Railways are on a much smaller scale than the Canadian railways. The engines are smaller and the rolling stock is lighter. The scenery from Port Aux Basques to St. John's varies very much, some parts being like the Grampians of Scotland, and other parts bearing a strong resemblance to Cornwall. In Canada and U.S.A. the trains all have the baggage wagons in front of the passenger coaches.—[R. B. DON ADAMSON.]

### The Norwegian State Railways.

I ENCLOSE two photographs of trains (one reproduced) on the Norwegian State Railways. No. 1 is of the Oslo train about to leave Åndalsnes for Dombås, where it is attached to the train from Trondhjem. The joint train then proceeds to Oslo, and is often very heavy, the coaches being of very solid construction. The second photograph is of a goods train at Otta. Both the engines photographed are 4-6-0's, and were built at the Hamar workshops. The State Railway's locomotives are painted black. They are all very powerful, as even the main lines abound in terrific gradients, and on the Dorre railway a summit of over three thousand feet is reached, and on the Bergen railway a height of over 4,200 feet is attained at Finse. Speeds are not high, but all lines are single, and stops are made at nearly every station. In the day, 2nd and 3rd class corridor and observation cars only are run, but on the principal night trains three classes of sleeping cars are found. Only a few restaurant cars are run, the usual procedure being to stop for about 20 minutes or so to enable passengers to obtain a meal at the station buffet. The observation cars are very comfortable, having large plate glass windows, and the running of the trains is strikingly smooth. On the higher and more exposed sections, snow sheds and fences are very frequent, and enormous rotary snow-ploughs have to be used continuously in winter. On the Dorre

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line and elsewhere the track has had to be carried in tunnels as a precaution against avalanches. In places there are some wonderful engineering feats, and on the recently opened Andalsnes line there is a double loop at Verma, with two spiral tunnels cut in the solid rock and a lofty viaduct crossing the river valley at a great height.—[H. R. C. K.]

### Notes on New Zealand Railways.

THE New Zealand railways are of 3 ft. 6 in. gauge, and tunnels, bridges and cuttings were made very small in the early days, so that the loading gauge is practically a disaster. A week or two ago the first of a series of Garratt engines, built by Beyer, Peacock & Company, was tried on the severe grades and sharp curves out of Wellington, on the main line to Auckland. Performance was, I believe, very satisfactory, and we were informed that a "record" load of 320 tons was hauled out of Wellington. I fancy I am right in saying that no other single engine in the country capable of negotiating that section of line could haul more than 190 tons up these grades. Unfortunately, February was a very dry month, and the Garratt set going a string of grass fires alongside the line!

Our railway at Nelson is 64 miles long, at present ending in bush on the Buller River, and only twice a week do trains run the full length of line. Glenhope (60 miles) has trains five days a week, the time taken being four hours by a morning train and four hours ten minutes by an afternoon train. All the engines are tanks, three being 2-6-4's and three being 0-6-2's, weighing from 25 to about 40 tons. However, the new Government has decided to proceed vigorously with the further construction of the line, which will finally link up at Iuangahua Junction with the West Coast system, giving through communication with Christchurch via Otira Tunnel, and so with the main line down to Invercargill and Bluff—about 700 miles altogether, but one hesitates to imagine the journey time. The gap to be filled on this route is only 58 miles, but most of it is through broken, mountainous and difficult country.

Another line, the completion of which is in the Government programme, is that known as the South Island East Coast Line from Pichon to Christchurch and Bluff. Here the gap is about 70 miles of moderately difficult country, and the line, when completed, will extend about 590 miles. It will be some years, however, before these works are completed.—[H. W. SADLIER.]

*Photo.*] NORWEGIAN STATE RAILWAYS. GOODS TRAIN AT OTTA. [*H. King.*

### The Grand Trunk Railway Route of India.

APRIL 1, 1929, was a red-letter day in the history of railway development in India, for from this day through communication from the north-west corner of India to the south of India was established. Hitherto there has been no through train



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in India running over a distance of 1,450 miles, as shown in the following table:—

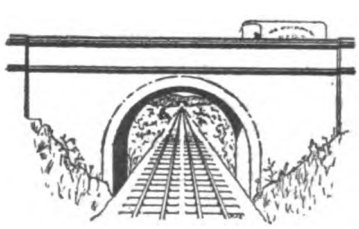
| Route. | Railways. | Distance in Miles. | Time Occupied. |
|---|---|---|---|
| Calcutta to Bombay via Allahabad .. | G.I.P. and E.I.R. .. | 1,349 | 45 hours. |
| Calcutta to Bombay via Nagpur .. | B.N.R. and G.I.P. .. | 1,223 | 39½ ,, |
| Calcutta to Madras .. .. .. | B.N.R. and M.S.M... | 1,032 | 38 ,, |
| Calcutta to Ambala .. .. .. | E.I.R. .. .. | 1,026 | 31 ,, |
| Bombay to Peshawar .. .. .. | B.B.C.I. and N.W.R. | 1,450 | 51 ,, |
| Bombay to Delhi .. .. .. | G.I.P. .. .. | 957 | 31½ ,, |

Now a through train leaves Peshawar for South India, and goes direct to Madras in 73 hours, covering a distance of 1,958 miles. Two bogie coaches from this train are detached and attached to another mail train leaving Madras for Mangalore, a distance of 550 miles, which is covered in 20 hours. A passenger can thus go from Peshawar, at the north-west corner of India, to Mangalore and *vice versa*, a distance of 2,508 miles, in 94 hours, without change of train. From Himalayas to Cape Comorin the distance is even less, but, unfortunately, the idea of running a train from Himalayas to Cape Comorin is not feasible at present, as the gauge from Madras to Cape Comorin is one metre (3 ft. 3⅜ in.), whereas the rest of the gauge is 5 ft. 6 in., the broadest gauge in India, nay, in the world at present. (There is a proposal to construct a 7-ft. gauge from London to Paris by a tunnel under the Straits of Dover.)

The new Grand Trunk express connects not only Madras and Nagpur direct with Delhi, but also Peshawar on one side and Mangalore on the other. Thus every provincial capital is connected with Delhi by a direct route, enabling the members of the Legislative Assembly to attend the sessions with the least possible inconvenience. The credit of the above-said service is due to the N.G.S.R. in completing a link of 146 miles from Kazipet to Bellarshah, thus bringing Delhi nearer to Madras by 210 miles and Nagpur nearer to Madras by 450 miles. Details of the new service are given above.

—[P. SUBBA RAO, VIZAGAPATAM.]

| | Railway. | Distance in Miles. | — | Time Occupied. | Remarks. |
|---|---|---|---|---|---|
| Peshawar to Delhi .. .. .. | N.W.R. | 598 | — | 23hours | |
| Delhi to Nagpur .. .. .. .. | G.I.P. | 679 | — | 25 ,, | |
| Nagpur to Bellarshah .. .. .. | G.I.P. | 131 | 681 | 25 ,, | 2,508 |
| Bellarshah to Bezwada .. .. .. | N.G.S. | 282 | | | miles in |
| Bezwada to Madras .. .. .. | M.S.M. | 262 | | | 94 hours |
| Madras to Mangalore .. .. .. | S.I.R. | 550 | — | 21 ,, | |



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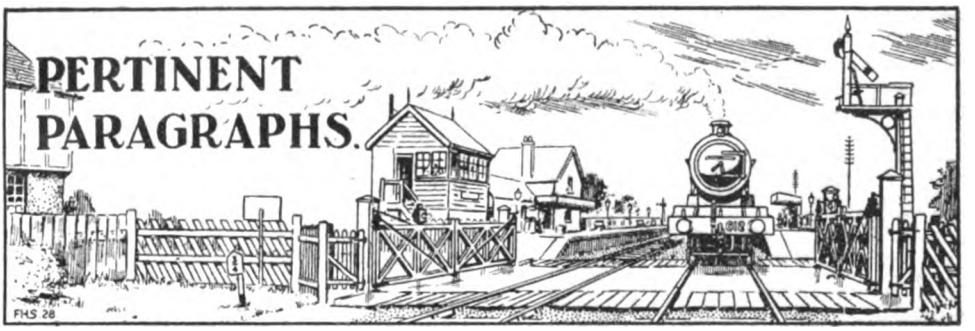


## Railway Returns for 1928.

A PRELIMINARY statement, giving in summarised form particulars for 1928 of the accounts and statistical returns of the railways in Great Britain, has been issued by the Ministry of Transport.

Total capital expenditure was £1,216,100,000. On revenue account, net receipts from the working of railways and ancillary businesses amounted to £40,500,000. Among these ancillary businesses is now included collection and delivery of parcels and goods, while certain adjustments have been made in the dock figures. Miscellaneous receipts (net) were £7,400,000, while rents and other fixed charges, etc., were £2,700,000, leaving the net revenue of £45,200,000. The average rate of interest and dividend paid per cent. of capital receipts was 3.8 per cent.

Total passenger-train receipts were £88,900,000. Receipts from ordinary passengers were £56,600,000. Workmen's ticket receipts increased to £4,000,000. The number of "originating" ordinary passengers and workmen was 1,196,424,000, or, excluding London Tubes and Metropolitan District Railway, 907,524,000. Season-ticket receipts fell to £10,500,000, and parcels, etc., to £17,800,000. Total goods-train receipts were £103,300,000.

Merchandise (excluding Classes 1-6) brought in £50,900,000, the tonnages conveyed being 57,226,600. Receipts from minerals and merchandise (Classes 1-6) were £15,900,000, the tonnage conveyed being 61,569,000. Coal, coke and patent-fuel receipts fell to £34,500,000, the tonnage falling to 187,334,000.

Railway traffic expenditure was £154,100,000, the operating ratio being 79.4 per cent. Maintenance expenditure was reduced from £50,700,000 in 1927 to £49,200,000 in 1928; locomotive running expenses from £39,900,000 to £36,600,000; and traffic expenses from £54,300,000 to £53,200,000.

## Mileage, Rolling Stock, &c.

ROUTE-MILES open for traffic totalled 20,387, the total running lines reduced to single track being 37,099 miles. Sidings, reduced to single track, were 15,468 miles. Total engine-miles were 598,271,000. The average receipt per passenger journey was 1s. 3.2d. For all descriptions of goods traffic (excluding livestock) the average rate per ton was 6s. 7d. For merchandise (excluding Classes 1-6) the average was 17s. 10d.; for minerals and merchandise (Classes 1-6) the average was 5s. 2d.; and for coal, coke and patent fuel the average rate per ton was 3s. 8d.

The number of steam and petrol locomotives in service was 23,625, a decrease of 246 compared with 1927, while the number of electric locomotives remained at 40. Passenger-carrying vehicles decreased to 51,980, other coaching vehicles numbering 21,370. There were 706,052 merchandise and mineral vehicles. Service vehicles numbered 49,506. There were 358 passenger road motor vehicles (289 in 1927) and 3,466 for parcels and goods (2,861 in 1927), while horse wagons and carts for parcels and goods work dropped slightly to 32,067. Locomotive renewals shown under "Construction and Maintenance of Rolling Stock" remained at 664, and none is shown as chargeable to capital account. There were 156 rail motor and electric train vehicles charged to capital account, and 103 were renewals. Under the heading of "Merchandise and Mineral Vehicles" 18 were shown as charged to capital account, and 23,838 were renewed. Shunting horses numbered 809, a drop of 35 since 1927.

## Model Railway Club Exhibition.

THE previous annual successes of the exhibitions of members' work staged by the Model Railway Club were again repeated by the attractive display shown in the Kingsway Hall, London, W.C.1., from



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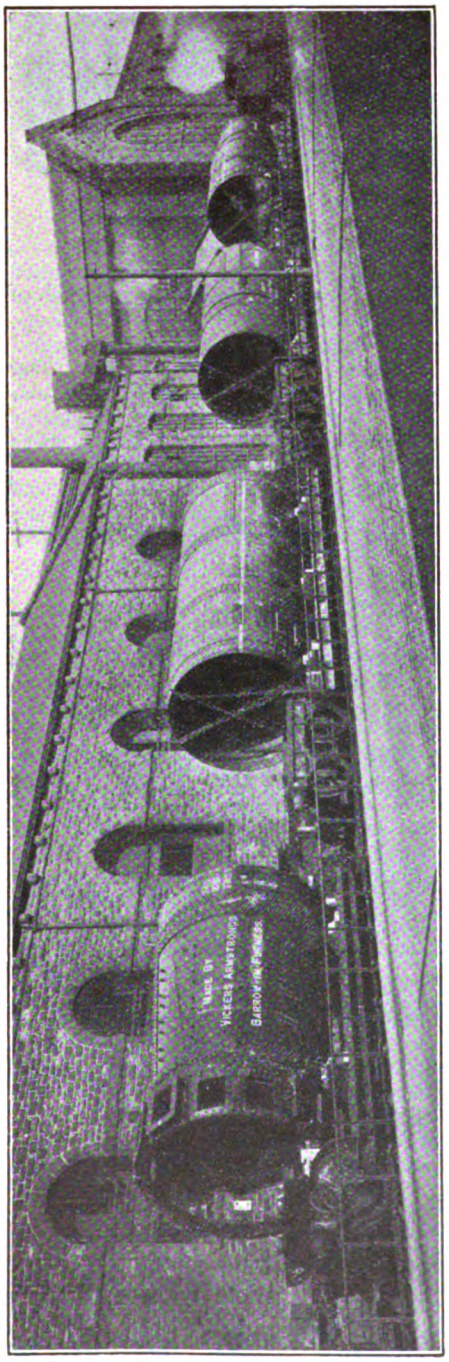
Wednesday, April 17, to Saturday, April 20. The increasing activity of the members and the interest shown by them in railway rolling stock and equipment of every description was indicated by the wide range of subjects modelled. Gauge " 0 " continues to hold its position as the most popular size for model work, but the diminutive " 00 " gauge, with its extremely realistic possibilities, is receiving increasing support. The inclusion of a larger number of steam-driven models than has been shown in the more recent exhibitions indicates a return to favour of steam operation for model railway work.



AN EXCEPTIONAL LOAD ON THE L.M.S.R. (See page 507.)

A feature of recent exhibitions has been the inclusion of a noteworthy and representative display of Great Western model locomotives and rolling stock, and this year exhibits were also shown in the form of joint displays of locomotives and rolling stock by L.N.E. and Southern enthusiasts. Practically every aspect of railway engineering was represented in the hall, the models ranging from historical and modern locomotives to railway docks and from breakdown cranes to signalling and permanent-way exhibits. A railway dock model, shown by Mr. A. Knock, was built to the " 00 " gauge, and occupied the centre of a large table. An electrically operated " 00 " gauge model railway, the work of Messrs. J. C. Watts and H. G. Carr, encircled the dock exhibit. An " 0 " gauge tank locomotive of the 0-8-2 type, with electric drive, was among the various interesting models shown by Mr. G. P. Keen.

The exhibits in the L.N.E.R. and Southern sections were representative of all the principal locomotive classes, and were accompanied by examples of passenger and goods stock. A model L.N.E.R., N.E. section, class R.I. 4-4-0 locomotive ; an L.N.E.R. triplet articulated main line corridor set ; a group of three Southern railway, L.B.S.C. section, 0-4-2T's ; and a Southern electric motor coach were among the items of especial interest in these sections. The Great Western section exhibits were thoroughly representative. Among the remaining locomotive exhibits of note there was a fine example of a half-scale heavy 2-8-4 articulated tank locomotive in which the leading pony truck and first coupled axle were arranged as an independent unit and the remaining coupled axles were combined with the trailing bogie. An example of the skilful employment of wood in model locomotive building was shown in the form of a model Great Southern Railways (Ireland) two-cylinder 4-6-0 locomotive, No. 500, the property of Mr. J. R. Bazin, the retiring Chief Mechanical Engineer of that railway. It was built entirely of wood by Mr. Brady, a pattern-maker.

Signalling and permanent-way interests were well represented, and the models

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shown included four signal cabins, ranging in scale from 4 mm. to ½ in. Messrs. Lance showed a section of their model "0" gauge railway, which included a terminal station, locomotive coaling stage, signal cabin and a tiny steam lorry. Exhibits by Mr. F. G. Brampton formed part of a very complete 1-in. gauge signalling and permanent-way layout under construction.

As usual, the locomotives running on the passenger carrying track, kindly loaned by the Society of Model and Experimental Engineers, were a great attraction, and throughout the exhibition one or other of the various engines in steam was busily engaged hauling enthusiastic passengers up and down the track. The engines used on this track included a 1-in. scale S. & D.J.R. 2-8-0 by Mr. A. Lamb; a ¾-in. scale 0-6-0 goods locomotive by Mr. C. W. Vickerage; a G.N.R. Atlantic by Driver Irwin, L.N.E.R.; a 1½-in. scale N.B.R. Atlantic by Mr. G. Kennion; a 1½-in. scale L.T. & S.R. 4-4-2T by Mr. V. Storey; and the veteran ¾-in. scale 4-8-0 *Cosmo Bonsor* by Mr. J. C. Crebbin. A model railway cinema show was given at intervals.

The value of the exhibition to the model maker was enhanced by the various interesting exhibits shown by firms on the trade stands. These included displays by W. J. Bassett, Lowke & Co., Ltd.; Bonds, of Euston Road, Limited; the Leeds Model Company; R. F. Stedman & Co., Ltd.; Walkers (Baker Street), Limited; G. Kennion & Company; Buck & Ryan, Limited; The Windsor Model Company; the Grosvenor Model Company; and Percival Marshall & Company. Capt. R. P. Henvey, of White Cottage, Shirley, near Croydon, is the Secretary of the Model Railway Club.

## New Platform Connecting Manchester Stations Opened.

THE longest railway platform in Europe —that between the L.M.S. Victoria and Exchange Stations, Manchester — was opened recently by Miss Ena Best, the "Railway Queen." This platform is 2,238 ft. long, and took three years to complete. It will accommodate three trains simultaneously. The building of the new platform has involved:—

The strengthening and widening by 30 ft. of the bridge that carries the railway over the river Irwell.

The provision of numerous new "cross-over" junctions.

The installation of a new electrically-operated four-colour signalling system.

2,320 cub. yards of concrete were used in alterations to the bridge, and a parapet girder 142 ft. long and weighing 85 tons was slewed a distance of 32 ft. A steel lattice girder weighing 100 tons was constructed on the site. The whole of the work has been carried out under the direction of the L.M.S. engineering staff.

Mr. E. B. Fielden, M.P., Deputy Chairman, L.M.S.R., presided at the opening ceremony.

## Manchester South Junction and Altrincham Railway Electrification.

THE L.N.E. and L.M.S. Railways announce that work is being commenced this month on the erection of the overhead electrical equipment in connection with the electrification of the Manchester, South Junction and Altrincham Line. The form of electrification adopted is the overhead conductor system with 1,500 volts direct current, in accordance with the Report of the Railway Electrification Committee, 1927.

The rolling-stock will consist of six-car trains of the compartment type, which will be divided into three-car trains. Each six-car train will have a seating capacity for 536 passengers. Increased and accelerated train services will be provided when electrical traction commences, representing a 50 per cent. increase in train mileage over the augmented steam service, or 80 per cent. over the steam service in 1927.

Two new stations at Dane Road and at Navigation Crossing (North Altrincham) are to be constructed, and it is intended to open the Old Trafford Cricket Ground station permanently. An electric train repair and inspection depôt will be established at Altrincham.

The Manchester South Junction and Altrincham Railway from London Road to Ordsall Lane via Oxford Road was commenced in 1845. Later the portion of the line from Oxford Road to Altrincham was completed, and the first steam train was run over the whole distance of 8¾ miles in 1849. The jubilee of the Manchester South Junction and Altrincham Railway was in 1899, and a special publication was issued commemorating this event. The line has, therefore, been working in public service for 80 years under steam traction. Early in 1928 a recommendation was made by the Joint Committee to the boards of the London Midland and Scottish and London and North Eastern Railways that the electrification of the line be proceeded with.

## Locomotive and Train Working in Cornwall.

MR. F. L. JONES mentions that a number of the "Hall" class engines are now stationed at Newton Abbot, Laira and

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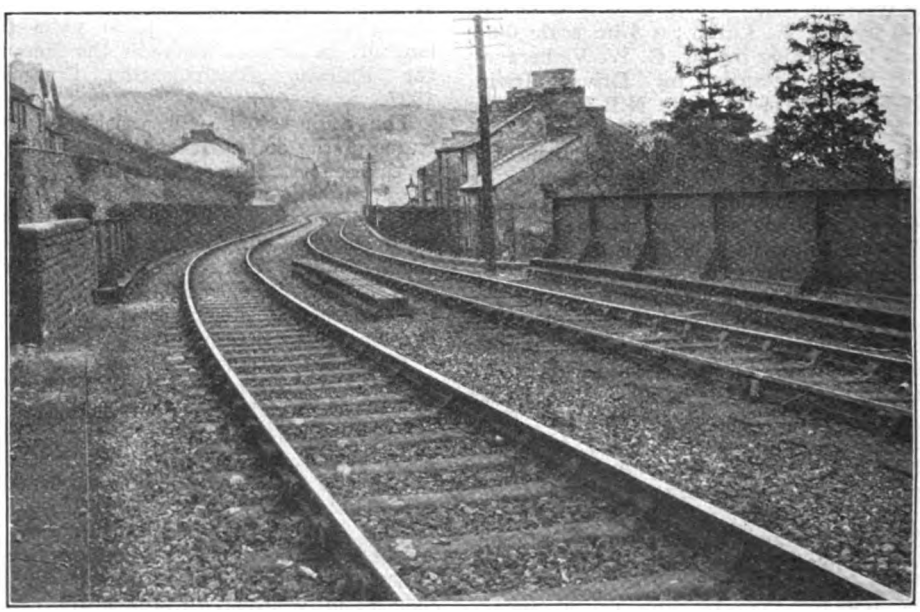
Penzance. The up "Cornish Riviera Limited" is worked by a Truro engine from Penzance to Truro, and then to North Road, Plymouth, by a "Castle," "Hall," or 2-6-0. The engine detached at Truro takes the 10.30 a.m. Penzance to Wolverhampton as far as Plymouth. On another turn a "Hall" takes the 11 a.m. ex-Penzance right through to Exeter, returning to Newton Abbot and proceeding thence next morning to Plymouth. It then proceeds to Penzance and leaves again on the 12.55 p.m. to Plymouth, returning at 4.55 p.m. This two-day schedule is repeated for the week. Mr. Jones makes further remarks in regard to engine working in this district, and sends the following notes of a more general character:—The line between St. Erth and Marazion is now being doubled, so that only two stretches of single line remain between Paddington and Penzance: the line over the Saltash Bridge and that between Redruth and Scorrier.



G.W.R. TRACK WITH STEEL SLEEPERS ON REVERSE CURVES.

### Steel Sleepers on the G.W.R.

Two experimental lengths of steel sleeper track have recently been laid near Risca and near Twyford. At the former, on the Western Valleys line, half a mile of track has been relaid with steel sleepers between Risca and Cross Keys, where the traffic is frequent and heavy and the line is formed of comparatively sharp reverse curves. As much as 40,000 tons of traffic, chiefly coal, passes over the line in 24 hours. This, combined with curves which are as sharp as eleven chains in radius, constitutes a severe test on the sleepers. The ballast used is South Wales slag, and its possibly corrosive effect upon the steel sleepers will be watched.

Near Twyford the length selected is the down relief line, between 33 m. and 33 m. 40 c., where ordinary high speed is run and the line is on a slight curve. The ballast in this case is also South Wales slag. At both places the length of sleeper adopted is 8 ft., but a further half-mile is being laid in the down relief line near Twyford (from 32 m. 40 c. to 33 m.), with sleepers 8 ft. 6 in. long and with stone ballast. In addition, an experimental length will be laid in the up main line opposite the locomotive shops at Swindon with 8-ft. and 8-ft. 6-in. steel sleepers and 8-ft. 6-in. timber sleepers, to enable comparative deflection tests to be taken under fast-running conditions on a straight road.

The design selected for trial on the Great Western Railway is the G.K.N. Composite design, manufactured by Guest, Keen & Nettlefolds at Dowlais. The sleeper consists of a plate $\frac{3}{8}$ in. thick pressed to trough form, with a bead along the lower edge of the trough for stiffening purposes. It is $9\frac{1}{2}$ in. wide by $4\frac{7}{16}$ in. deep for a distance of 16 in. each side of the centre, and is

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spread to a width of 11 in. by 3⅛ in. deep for the remainder of its length. The ends are turned down and splayed to a width of 12 in. The fastening of the chair to the sleeper is accomplished by casting the former direct on to the latter and forming, in the process, four snugs (part of the chair) on the underside of the sleeper. By this means the use of chair-bolts is avoided, and it is anticipated that slackness between the chair and the sleeper will not occur. Severe tests have been carried out with the object of breaking the chair from the sleeper, but the chair itself invariably broke before the attachment gave way. The experience gained so far with the sleepers already laid is quite satisfactory, the running over them is good, and no special difficulty has been experienced in maintaining the line.

### L.N.E.R. Traffic Observations.

MR. R. A. H. WEIGHT writes:—"In connection with the 'Amateur Association Football Final,' which was played at Highbury on Saturday, April 20, special trains were run respectively from Ilford and Leyton to Finsbury Park (and empty to Bounds Green to await return time), consisting of G.E. articulated suburban set trains. They were worked by tank locomotives 7006, 2603, 2618, 2625, via Stratford, Victoria Park, Dalston Western Junction and Canonbury. The same route is also used for the regular G.E. Woolwich to Finsbury Park football specials in winter; for the G.N. Southend excursions at holiday periods and in summer; also for goods traffic between Ferme Park, G.N., and the Docks.

"For the Cup Final at Wembley on April 27 the L.N.E.R. ran twenty-six special trains in and out of King's Cross emanating from Edinburgh and all parts of the industrial North and Midlands. The average gross load of these trains (greater than hitherto) was about 350 tons, and they arrived at intervals from 3.51 a.m. to 11.0 a.m. on the Saturday. Quite a number of restaurant cars were provided for parties. The Scotch return special left at 10.3 p.m., whilst the remainder departed between 11.15 p.m. on the Saturday and 2.40 a.m. on Sunday.

"The following brief summary of engines employed to and from King's Cross will probably be of interest. A number of them worked throughout:—

"L.N.E.: No. 253 (3 cyl. 4-4-0 *Oxfordshire*).

"N.E. 4-4-2's: Nos. 2203, 2211, 2196, 2167, 1753, 716.

"G.C. 4-6-0's: Nos. 5459, 5469, 6165 *Valour*, 6098, 6101.

"G.N. 4-4-2's: Nos. 4422, 4418, 4445; also 3272, stationed on G.C.

"4-4-0's: No. 4331 as pilot.

"G.N. 3 cyl. 2-6-0's: Nos. 75, 111.

"2 cyl. do.: Nos. 4632, 4638, and 4643.

"Pacifics: Nos. 4473 *Solario*, 4477 *Gay Crusader*, 4480 *Enterprise*, 2544 *Lemberg*, 2550 *Blink Bonny*.

"On the Thursday before Easter this year the up "Queen of Scots Pullman" covered the 115 miles from passing Newark to passing Wood Green in 106 minutes, notwithstanding a load of 325 tons, thus averaging 65 m.p.h. over a road of varying gradients for a remarkably long distance and making up no less than 13 minutes lost time. The engine was No. 4450, Ivatt Atlantic, and the Driver W. Barnes. The fast-timed up Yorkshire express, due King's Cross at 11.35 a.m. on the Tuesday in Easter week ran equally fast, for she took only 89¾ minutes for the 97½ miles Stoke summit to Finsbury Park, and covered the 105½ miles Grantham start to King's Cross stop, including a slack, in 104 minutes. The load was 380 tons, the engine Super-Pacific 2747 *Coronach*, and the driver J. Morley.

"A lesser but noteworthy performance which I recently enjoyed was a run on the non-stop relief train which leaves Hitchin at 9.18 p.m. on Sundays for Finsbury Park (and King's Cross), when a G.C. 4-6-2T, No. 5452, hauling a G.N. suburban bogie set train, took only 32¼ minutes for the 29½ miles start to stop, and so 'cut' the schedule by nearly six minutes. The maximum speed was about 73 m.p.h., and the engine, Driver Gregory told me, was worked for the greater part of the way on 18 per cent. cut-off!

"The first of the regular two nightly express milk trains from the Midlands, which is timed to run without a stop from Grantham to Finsbury Park, 103 miles, in 129 minutes, has on two recent occasions been worked by two Ivatt 4-4-0 locomotives and has thus afforded a sight which is very rare on the G.N. section to-day, but which was, of course, fairly common over twenty years ago. The Lincolnshire flower crop began to mature soon after Easter, and necessitated the running of a special van train from Spalding to King's Cross (due 10.25 p.m.) conveying blooms for the London market. This is an annual arrangement during the season, and there are also through vans worked by ordinary or special trains, as required, to the North."

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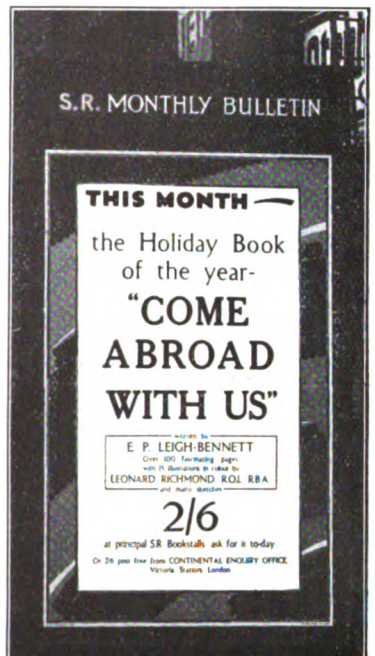


"Monthly Bulletin."

Small Station Board at Junction of Station Approach and Main Road.

**PUBLICITY DEVELOPMENTS ON THE SOUTHERN RAILWAY.**

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**Publicity Developments on the Southern Railway.**

We are indebted to Mr. J. B. Elliott, Public Relations and Advertising Assistant to the General Manager, Southern Railway, for particulars of interesting publicity developments now in process of realisation, and for the photographs reproduced. The general principle is that of using existing railway space so as to appeal to the public most effectively. Three methods are employed:—

(1) *"Banner" Boards.*—Large boards have been erected outside all principal stations, or, where the station is tucked away, have been set up facing the nearest main road. On these boards a specially-written sales poster is displayed every month, drawing the attention of the public to some specific attraction or facility which it is desired to accentuate. This may be a special Cheap Ticket to London, a Guide-book and so on, but the essence of the scheme is that each poster is drawn up in particular relation to the district in which it is displayed. It therefore makes a strong personal appeal to every local inhabitant. This poster is changed on the first of every month.

(2) *"S.R. Monthly Bulletin."*—About 250 picked sites have been chosen, principally on the platforms, at points where passengers congregate or wait for trains, and on these sites special 4-sheet boards have been erected, more or less as solus positions, with an enamel-plate heading "S.R. Monthly Bulletin." The idea of these boards is to enable the company to broadcast a message simultaneously throughout the system on the first of every month in positions which will be seen by the greatest number of passengers. A special skeleton design capable of being printed in different combinations of colours is being used, and within this skeleton border the message appears. In order to ensure a simultaneous washing down of the previous month's posters and display of the new, arrangements have been made with the Trade Advertising Section to carry out the bill-posting, and in order to draw the attention of the public to the fact that a new bill has been posted, the skeleton border is changed in colour every month.

(3) *Small Station Boards.*—Many country stations suffer from being off main roads, and are often approached by a smaller road. Hitherto this has meant that the only outdoor publicity available has been by means of boards on the front of the station building, which naturally only appeals to those using the station. Periodical distributions of handbills, and poster boards in villages, &c., have to a certain extent helped to remedy this, but it was felt that more could be done. A special design of board has therefore been prepared, and is now being erected at the junction point where the station approach joins the main road. The heading of the board is a name plate or direction sign, and the remainder is a black-board background with a glass front, which can be locked by the station staff after they have filled in with chalk whatever cheap tickets or excursions they wish to announce.

Careful investigation has shown already that the sale of cheap tickets goes up almost immediately these measures have been applied to any particular station, and as all the ordinary publicity measures which have been organised are to continue (such as the weekly insertion of cheap ticket and train announcements in the local newspapers), a powerful and persistent campaign is available throughout the year.

**The Highland Section of the L.M.S.R.**

An Edinburgh reader, Mr. Eric R. Birkett, sends some interesting notes describing a trip to Inverness and back by day excursion, 13s. for the 331 miles. He left Waverley at 4.21 a.m. The "Aberdonian," from King's Cross, was triplicated that day, the Perth train leaving at 4.45 a.m., eight coaches and a van, worked by "Director," 4-4-0 No. 6391, *Wizard of the Moor*. Perth was reached at 5.51 a.m. with two signal checks. Incidentally, the train used the Glasgow lines from Waverley to Saughton Junction instead of the "north" set as usual. Perth was left at 6.53 a.m. (traffic was very heavy that day) with Nos. 14682 and 14757 and fourteen bogies. These engines continued right through to Inverness, although part of the train, for the Forres route, was detached at Aviemore. Inverness was reached at 10.35 a.m. Mr. Birkett returned by the 11.20 p.m. mail, which consisted of fifteen bogies and two trucks. It was, however, worked by a 4-4-0 "Loch," as 100 minutes are allowed to Aviemore, the schedule, to fit in at Perth, being a very easy one. He also mentions the Edinburgh-Mallaig trip, 13s. for 420 miles. Leave Waverley 4.30 a.m., due Mallaig 11.53 a.m.; leave Mallaig 2.0 p.m., Waverley arr. 9.33 p.m. —"a good day's outing."

With regard to inquiries, Mr. Birkett mentions the platforms at West Fearn, between Bonar Bridge and Edderton, and Mid-Fearn, between Edderton and Tain. Fearn proper is between Tain and Nigg,

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**SWANSEA AND MUMBLES RAILWAY ELECTRIFICATION.**
Sub-station Interior with Two Metrovick 500-kW. Rotary Converters.

and is an ordinary station. "The platforms mentioned are for school children, and are used only by certain trains during term time." The 6.25 a.m. from Perth and the 4 p.m. from Inverness stop at Dalnaspidal and Dalwhinnie on Mondays and Fridays is for school-children attending Kingussie school, but spending the week-ends at home. The Cromarty Light Railways Company has now been wound up. Rails from Conon were lifted during the war."

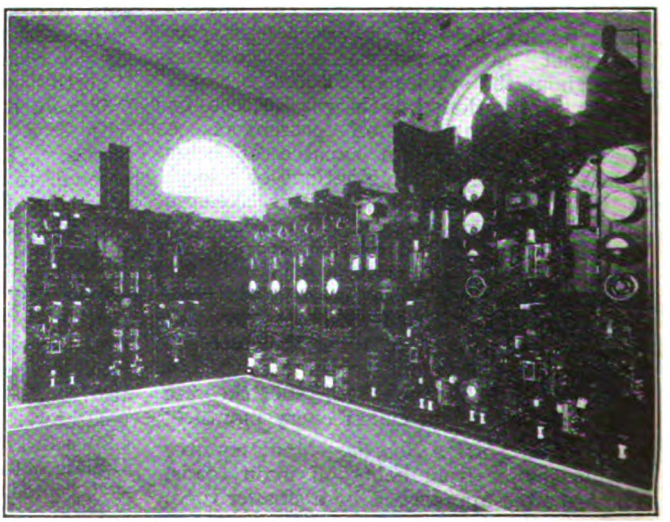
### Electrification of the Mumbles Railways.

To commemorate the electrification of the Mumbles Railway, the Chairman and Directors of the South Wales Transport Company, Limited, entertained a large gathering at a luncheon at the Mumbles Pier Pavilion on Thursday, April 18. Mr. G. C. Tegetmeier, Chairman, in submitting the toast of "The Borough of Swansea," coupled with it the name of the Mayor, to whom he presented a canteen of cutlery in commemoration of the electrification of the railway. The Mayor expressed thanks for the gift, and recalled the history of the railway and how the Corporation took a great interest in its construction, mentioning that the first proposal was for a navigable canal from Swansea to Mumbles. Sir Percy Molyneux submitted the toast of "The Mumbles Electric Railway," and complimented Mr. Tegetmeier and the company upon the courage they had shown in putting down another £125,000 to bring the line up to date.

The power for the newly electrified railway is supplied from the generating station of the Swansea Corporation, through a sub-station provided by the Swansea Corporation at Blackpill, about the mid-point of the route. This sub-station is arranged for fully automatic control. Its equipment includes two 500-kW. rotary converters, which, together with the A.C. and D.C. switchgear, a negative booster set, and the automatic control gear, have been supplied by the Metropolitan-Vickers Electrical Company, Limited.

### Express Train Running in Switzerland.

Mr. E. L. P. Quested contends that Mr. J. P. Pearson, in his article in the May number, is not justified in remarking, "I fear that there is no steam locomotive



**SWANSEA AND MUMBLES RAILWAY ELECTRIFICATION.**
Metrovick Automatic D.C. Switchboard for Machines, Track Feeders and Negative Booster Equipment.

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doing work like this," in view of the fact that the electric locomotive is not comparable with the steam locomotive because of its different method of working, especially on steep gradients, and because the electric locomotive derives its power from an external source. It is, in fact, a transmitter of power, and not a producer. This view is, of course, quite a correct one, and to that extent we endorse his remarks. At the same time, it has to be remembered that the crucial test is the way trains are worked. To a passenger it does not matter much which method of traction is adopted, the important factor being the time taken stage by stage. Hence, if electricity will do what steam cannot do, and the expense of electrification can be justified, obviously electrification is desirable and advantageous providing that the cost is not too great. Similarly, suburban electrification is " the most powerful means of promoting growth of traffic," because it allows of increased traffic facilities to a degree that steam will not permit. It is not a question of steam *v.* electricity, but which will permit of desired increased speed and increased facilities, and so provide reasons for growth of traffic. At the same time, we quite agree that the steam locomotive possesses an attraction and interest all its own, but we see no reason why, one of these days, there should not develop a field of enthusiasm and interest in the electric locomotive, though this can hardly be until it works express and main-line trains and figures in the same way as the steam locomotive does at present.

**Locomotive Matters.**

THIS Section was introduced at a time when, following grouping, interesting transfers of engines and unusual workings were causing correspondents to tell us of their observations, many of which seemed to be worth passing on for the benefit of readers generally. In addition, so many letters were being received detailing observations generally that, instead of occasional notes in " What the Railways are Doing," or in " Pertinent Paragraphs " when justified, it was decided to devote a few pages to such items. That this policy was entirely justified has been very clearly evident, but as the effects of grouping have become more general and new post-grouping engines have caused many of the older classes to be distributed on a wide basis, information of this kind has ceased to possess so much special interest and a tendency has arisen for the Section to become more or less a medium for the exchange of information on locomotive matters generally. This in itself is quite a good thing, except for two reasons. One is that space limitations have rendered it necessary to restrict the items passed on to one or two regarded as of general interest from the many communications (often voluminous) received, while many letters have had to be acknowledged only, though we have been pleased and interested to read them. The second is that readers claiming to make statements authoritatively do not always agree, while inaccurate observation, misstatements of engine numbers, hearsay remarks and hasty assumptions have entailed a certain amount of correction (sometimes re-correction) and tended to suggest a degree of unreliability.

It is true that the Section has had the advantage of oversight and correction from officials of two of the four great railways, assistance which is very thankfully and cordially acknowledged, while our own knowledge of locomotives on British railways is by no means inconsiderable though far from omniscient, apart from the fact that we have not been able to give time to research or extensive checking. We have, therefore, reluctantly come to the conclusion that the Section has rather outlived its original purpose, while space and other factors render it impracticable to consider extending it as a " locomotive information exchange." In the circumstances, it will be discontinued as a special Section after this month. This will not, however, preclude references to matters of special interest in " What the Railways are Doing " and in other sections as justified, and we hope to pass on in this way many items of interest of the class hitherto given in " Locomotive Matters." We shall also continue to welcome letters from readers as in the past and to answer inquiries as practicable, and shall be only too pleased to peruse letters and reply as necessary, whether items noted therein are considered as sufficiently interesting for publication or not.

In closing, we have to thank the many readers who have contributed to the Section, and to the railway officers and others who have checked, corrected and amplified its contents, and we hope that none of our readers who have come to regard the " Locomotive Matters " section as one of special interest, including some who have stated that it is the part to which they turn first, will regard its discontinuance as a separate Section as in any sense a cause for grievance or personal regret, beyond the degree in which we ourselves share.

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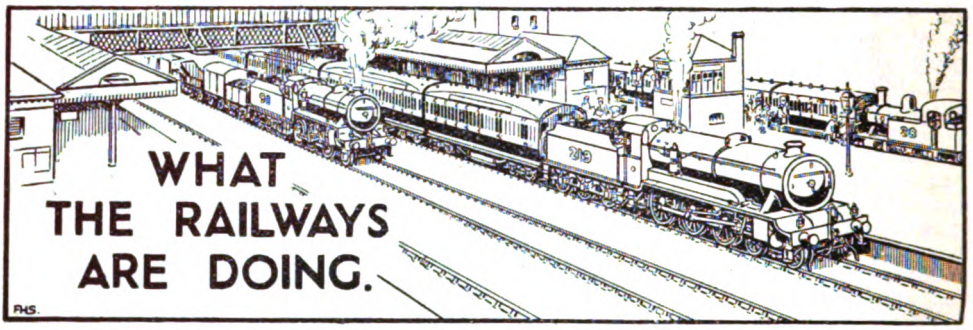


G.W.R. Staff Changes.

Mr. H. R. Griffiths, Divisional Superintendent, Bristol, retired on May 12.

Mr. Randolph G. Pole, Assistant Divisional Superintendent, Bristol, has been appointed Divisional Superintendent, Bristol.

Mr. H. J. Peacock, Head of the Goods Train Section, Office of the Superintendent of the Line, Paddington, has been appointed Assistant Divisional Superintendent, Bristol.

Mr. E. A. Haynes has been appointed Head of the Goods Train Section, Office of the Superintendent of the Line, in succession to Mr. Peacock.

Mr. A. J. Marks, Head of the Time-Table Section, Office of the Superintendent of the Line, Paddington, has retired, and is succeeded by Mr. W. R. Charlton.

* * *

Mr. Randolph G. Pole, who has been appointed to succeed Mr. H. R. Griffiths as Divisional Superintendent, Bristol, G.W.R., is a brother of Sir Felix J. C. Pole, General Manager. He entered G.W.R. service in 1898 at Devizes, at that time situate in the Reading Traffic Division, which was subsequently absorbed by the Bristol and London Divisions. After general station experience at Pangbourne and Newbury, Mr. Pole was removed to the Office of the Superintendent of the Line at Paddington in November, 1900, where he had experience in practically all departments. He was attached to the Superintendent of the Line's travelling staff from 1906 to 1908 as Parcel Traffic Supervisor, and from 1916 to 1919 as a Train Runner. He went to Westbury in 1919 as Chief Clerk to the Westbury Divisional Superintendent, and when that Division was absorbed by the Bristol Division in 1922, was transferred to Bristol as Assistant Divisional Superintendent.

**MR. R. G. POLE,**
Appointed Divisional Superintendent, Bristol, G.W.R., as from May 13.

* * *

Mr. Frank Brown, who has been appointed by the Bristol Docks Committee Assistant General Manager of the Port of Bristol, has held the position of Assistant Docks Manager, Great Western Railway, jointly with Mr. B. Carpenter, since 1926.

* * *

We regret to record the sudden death, on April 29, at the age of 77, of Viscount Younger of Leckie, a Director of the Southern Railway, of the National Bank of Scotland and of Lloyds Bank.

* * *

Mr. A. Roy Craven, of 1 and 2, Old Post Office Street, Calcutta, has been appointed Hon. Secretary, Indian Centre of the Institution of Locomotive Engineers.

* * *

Recent L.M.S.R. Appointments.

The following appointments have been authorised:—

*Chief Goods Manager's Department.*

Mr. J. M. Irwin to be Irish Traffic Manager, Dublin.

Mr. R. D. Roberts to be District Traffic Superintendent, Swansea.

*Chief General Superintendent's Department.*

Mr. W. P. Bradbury to be Road Trans-



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port Assistant to General Superintendent (Passenger Commercial), Derby.

Mr. H. E. Horne to be Assistant General Superintendent (Passenger Commercial), Derby.

Mr. F. Ruffell to be Passenger Services Assistant to Chief General Superintendent, Derby.

Mr. S. H. Fisher to be Divisional Superintendent of Operation, Derby.

Mr. L. D. Ford to be Divisional Superintendent of Operation, Crewe.

Mr. P. Y. Woolley to be Divisional Controller, Freight Services, Crewe.

Mr. J. N. Phillipps to be Divisional Controller, Passenger Services, Crewe.

Mr. F. H. Fisher to be District Controller, Chester.

Mr. G. H. Buckley to be District Controller, Stoke.

Mr. E. D. Grasett to be Assistant to Chief General Superintendent (Discipline), Derby.

Mr. T. W. Royle to be Divisional Superintendent of Operation, Manchester.

Mr. A. P. Hunter to be District Controller, Gloucester.

Mr. H. Penney to be District Controller, Coalville.

*Chief Civil Engineer's Department.*

Mr. E. H. Morris to be District Engineer, Manchester (Exchange).

*Scotland.*

Mr. J. Adie to be District Controller, Motherwell.

Mr. J. Nicol to be District Controller, St. Rollox.

Mr. H. Greig to be Goods Agent, Perth.

* * *

THE MOST HON. THE MARQUESS OF ABERDEEN AND TEMAIR, K.T., P.C., G.C.M.G., G.C.V.O., presided at the seventy-first anniversary dinner of the Railway Benevolent Institution, which was held on May 1 at the Hamilton Hall, Great Eastern Hotel, Liverpool Street station, London.

* * *

MR. W. P. BRADBURY, who has been appointed to the new position of Road Transport Assistant to the General Superintendent (Passenger Commercial), L.M.S.R., commenced his railway career in the Department of the District Superintendent of the L.N.W.R. at Euston in February, 1905. A few years later he was transferred to the Department of the Superintendent of the Line. In January, 1915, he enlisted, and soon after accompanied to France the late Colonel (afterwards Brig.-General) G. E. Holland, C.I.E., D.S.O., who had been charged with the organisation of an inland water transport service in France and Belgium. Commissioned in France, Mr. Bradbury's promotion was rapid. He attained the rank of Major in 1917, and was appointed a Deputy Assistant Director of Inland Water Transport. His services were also recognised by the award of the Order of the British Empire, of which Mr. Bradbury is an officer. On the formation of the L.M.S.R. in 1923, and the setting up concurrently of

**MR. W. P. BRADBURY, O.B.E.,**

Appointed Road Transport Assistant to General Superintendent (Passenger Commercial), Derby, L.M.S.R.

a separate organisation for passenger commercial work, Mr. Bradbury became chief clerk to the first General Superintendent (Passenger Commercial), Mr. C. R. Byrom. Later he was appointed Assistant to Mr. Byrom's successor, Mr. Ashton Davies, the present General Superintendent (Passenger Commercial). For some time past a temporary organisation has existed in the Department of the Chief General Superintendent, under Mr. Ashton Davies, for developing passenger road transport interests, and of this organisation, now placed on a permanent footing, Mr. Bradbury has had charge.

* * *

WE regret to record the death in London, on April 19, of Sir Aubrey Brocklebank, third Baronet, at the age of 56. He was Chairman of T. & J. Brocklebank, one of

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the oldest shipping lines in the world, and a director of the Cunard Line, of the Great Western Railway Company, of the Suez Canal Company, of the Bank of Liverpool and Martins Limited, of the Liverpool and London and Globe Insurance Company, of the Narrow Gauge Railways Limited (of Cumberland), and of other undertakings. At his home at Nunsmere, Sandiway, Cheshire, he had a 5-in. gauge model railway, and he was also Chairman of the Ravenglass and Eskdale 15-in. gauge railway. To the Great Western Railway Board he was appointed in November, 1922, to fill the vacancy caused by the resignation of Mr. Ernest H. Cunard.

* * *

NEW L.N.E.R. APPOINTMENTS.

WE are officially advised by the London and North Eastern Railway that Mr. Alexander Wilson, Divisional General manager, Southern Area, will retire from the service under the age limit at the end of June and will be succeeded by Mr. G. F. Thurston, at present Chief Stores Superintendent. Before amalgamation Mr. Thurston was Secretary of the Great Eastern Railway Company. In 1923 he was appointed Joint Secretary to the London and North Eastern Railway Company, and in February, 1925, became Chief Stores Superintendent.

Mr. A. P. Ross, Manager and Engineer, Cheshire Lines Committee, will succeed Mr. Thurston as Chief Stores Superintendent as from July 1 next. Mr. Ross originally entered the service of the Great Northern Company and was appointed Engineer to the Cheshire Lines Committee in March, 1917, taking over in addition the duties of Manager to the Committee in December, 1926.

The following further appointments take effect immediately:

Mr. E. V. Taylor, Assistant District Goods Manager, Hull, to be District Goods Manager, Hull, in succession to the late Mr. R. L. Fergusson.

Mr. W. H. Waugh, Dock Superintendent, Western Docks, Hull, to be Assistant District Goods Manager, Hull, in succession to Mr. Taylor.

Mr. R. Pettit, Assistant District Passenger Manager, London, to be District Goods and Passenger Manager, Norwich, in succession to Mr. W. H. Hall, retired.

* * *

THE railway companies announce that, as an experiment from June 1 next, business firms who qualify with any one railway company for a trader's season ticket can obtain books of vouchers covering 10,000 miles of travel for use within a period of 12 months from date of issue. These vouchers may be used by members or employees travelling strictly on the business of their firms, and will be exchanged at railway booking offices for tickets as required. The reduction on the ordinary fares amounts to 23 per cent. first class and 20 per cent. third class.

* * *

WITH the opening of Chalvey Halt—between Slough and Windsor—the number of halts opened by the Great Western Railway is brought up to 332. These are situated on all parts of the company's system. Since January 1 thirteen new halts have been opened by the Great Western Railway.

* * *

LOCAL weekday passenger services in the Hull district have been reorganised and augmented, and placed as far as possible on a regular-interval basis during the greater part of the day at the following minutes past each hour, as under:—Brough and Beverley, 15 and 45; Withernsea, 40; Hornsea, 50; Hull and Barnsley Line, 55. These alterations involve the use of four additional Sentinel steam rail coaches.

* * *

FIRST introduced in 1925, there are now some 18,000 weekly "Underground" season tickets in use, and the scheme has now been extended on an even larger scale. Eventually it will be possible to obtain a weekly season ticket between any two stations on the "Underground" railways. The latest development of the scheme is the issue of tickets between stations on the Hampstead and principal stations on the District and Central London Railways. They are now issued between stations on the City Line to principal stations on the District and Piccadilly Railways.

* * *

ARRANGEMENTS have been made for a Sentinel car service to be run between Edinburgh, Ratho, Kirkliston and Bathgate, making a total of six cars in regular daily service in Scotland.

* * *

PULLMAN cars are to be introduced on the Great Western Railway between Plymouth and London on the special trains which meet transatlantic liners calling at Plymouth, and also between London and Torquay.

* * *

FOR the convenience of those travelling by main-line excursion trains from Victoria

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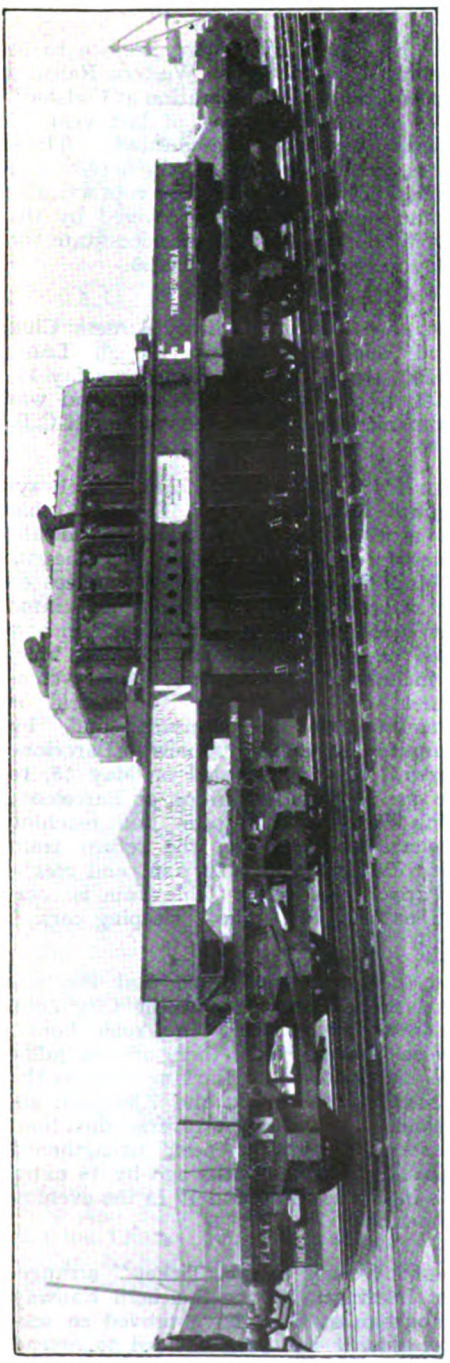

CONVEYANCE OF 60,000 kVA. METROVIK SINGLE-PHASE TRANSFORMER UNIT ON SPECIALLY CONSTRUCTED L.N.E.R. TRUCK TO DALMARNOCK.

and Charing Cross, and by the steamboat services from Tower Gardens Pier (Mark Lane station), earlier Sunday trains are run on the District Railway.

* * *

IN order to dispense with double-heading of passenger trains between Edinburgh and Dundee, it has been arranged for Pacifics to do all that is necessary between these points. These engines have to be fitted with Raven's automatic train-control arrangement for working between Edinburgh and Newcastle, and this apparatus has had to be modified slightly to clear the girders on the Forth Bridge.

* * *

THE L.N.E.R. announces that day excursion tickets to Newcastle in connection with the North-East Coast Exhibition will be issued every Saturday, third-class return fare £1. Tickets will be available by the 1.10 a.m. from King's Cross, arriving at Newcastle at 7.2 a.m., and for return by the 11.13 p.m. train from Newcastle (King's Cross, 5.55 a.m.), allowing 16 hours in Newcastle.

* * *

THE Wimbledon Model Railway Club is to visit the Messrs. Westinghouse Brake and Saxby Signal Co.'s Signal Works at Chippenham on June 6. On June 17 short lectures will be given by Club members on "My Model Railway." On June 22 a visit will be made to the "Underground" Acton Works in the morning and Feltham Marshalling Yard in the afternoon.

* * *

THE third annual dinner of the Transport Observation and Models Society was held at Pinoli's Restaurant, W.1, on Saturday, April 20, Mr. W. Hann, President, in the chair. Table decorations consisted of a Stroudley tank engine constructed by Mr. Wheeler, and wagons with brake van by Mr. Dear on a single line laid down the table. A Metropolitan ½-in. scale electric locomotive stood at the end. Following the loyal toast by the President, that of "The Society" was proposed by Mr. Westby, Chairman of the Committee, to which the Secretary replied. Mr. H. E. Dear (Editor of the *Transport Observer*), in proposing "The Visitors," alluded to the good spirit shown by Mr. C. F. Klapper, of the Wimbledon and District Model Railway Club, in helping the Society by producing the paper. Mr. Klapper replied.

* * *

ONE of the main problems in the design

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of the 60,000 kVA. and 45,000 kVA. transformers under construction, with other plant, in course of supply by the Metropolitan Vickers Electric Co., Ltd., for the Central Scotland section of the British electric supply grid which is now being set up, is that of keeping the dimensions within such limits that the transformers, in their tanks and complete with oil, could be accommodated for transport in railway trucks within the rather restricted loading gauge of the British railways. By co-operation between the engineers of the Central Electricity Board, the railway companies and the transformer manufacturers, a specially designed truck has been evolved for the work of transport. One of these special trucks, built by the London and North Eastern Railway, with two Metrovick single-phase transformer units of a 60,000-kVA. group loaded for despatch to Dalmarnock is illustrated on page 503. The truck has detachable girder sides between which the transformers are slung and supported with their bases only a few inches above the level of the rail face. On arrival at the site the detachable side girders allow the truck to be taken apart and drawn away from the transformers, the latter being jacked up from the truck in the meanwhile and then moved sideways off the track. The truck is then reassembled and despatched, the whole operation involving a minimum of delay.

* * *

AN order for eighty iron ore bogie hopper wagons of 66 tons capacity and 90 tons gross weight has been placed by the Bengal-Nagpur Railway with the Metropolitan-Cammell Carriage, Wagon and Finance Co., Ltd. These wagons have the highest capacity of any yet constructed for service in India, if not indeed the highest outside the United States. The order further comprises 20 bogie rail wagons each weighing 64 tons gross. The vehicles are being constructed under the supervision of Sir John Wolfe Barry & Partners, Consulting Engineers for the Bengal-Nagpur Railway.

* * *

THE half-day excursion fare from London (King's Cross or Liverpool Street) to Cambridge has been reduced from 5s. to 4s., and the half-day fare from King's Cross to Peterborough from 5s. to 4s. 6d.

* * *

NEW motor-car rates will, in some cases, enable tourists to have their cars conveyed to France and back by the Tilbury-Dunkerque route for less than the existing single fare. Cars should be at Tilbury (Marine) not later than 8 p.m., and will arrive at Dunkerque at 6 a.m., thus enabling tourists to make an early start on the other side. Return tickets are available for two months.

* * *

THE hundredth motor-lorry service to be inaugurated by the Great Western Railway has been brought into operation at Codshall, Staffs. At the beginning of last year 45 services had been inaugurated. These services, which operate within a radius of 12 miles of the railhead, cover practically the whole of the territory covered by the Great Western Railway, and necessitate the employment of 150 motor lorries.

* * *

THE new Southern Railway Athletic Club ground and pavilion at Plough Lane, Waddon, was opened on Saturday, May 11, at 3.30 p.m., by Lady Walker, who was accompanied by Sir Herbert Walker, K.C.B.

* * *

THE Paris-Orleans and Midi Railways announce that the "Sud Express" has been accelerated by 40 minutes on the journey from Paris to Lisbon, *via* Biarritz and Madrid, and by 1 hour 35 minutes on the return journey. The associated "Pyrenees-Côte d'Argent Express" is now formed of all-metal coaches painted blue, and including "grand luxe" single compartments. The journey to Madrid is accelerated by 25 minutes and by 11 minutes in return. A new "Barcelone Express" was inaugurated on May 15, to serve the Spanish Exhibition at Barcelona, leaving Paris at 7.10 p.m. and reaching Barcelona at 1.5 p.m., the return train leaving Barcelona at 3.22 p.m. and reaching Paris at 9.30 a.m. This train is composed entirely of "blue" sleeping cars.

* * *

THE L.M.S.R. announces that the services between Barking and the City have been intensified during the rush hours. Between 7 and 9 a.m. there are six additional trains from the Barking area to the City, and between 4.30 and 7.30 p.m. six additional trains in the reverse direction. The service has now been strengthened compared with 14 months ago by 15 extra trains in the morning and 17 in the evening rush periods.

* * *

THE "Weekly Season Ticket" arrangements instituted by the Southern Railway at suburban stations have proved so successful that it has been decided to extend them to a number of outer suburban stations in Kent and Surrey. These first- and third-class tickets are available from Sunday to Saturday inclusive, and are ob-

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tainable at the local Southern Railway station at any time after 12 noon on the Saturday previous.

* * *

In order to call attention to the forthcoming attractions of the Royal Tournament at Olympia, which opened there on May 23 and closes on June 8, the "Underground" Publicity Department has issued a clever and amusing poster, for use as a window panel in tube cars. A small illustration of the poster in question is reproduced, and its novel features will be readily appreciated.

* * *

The final Railways Athletic Association football match for Sir Felix J. C. Pole's Cup was played on the Millwall F.C. ground at New Cross on Thursday, April 25, and was won by the Southern Railway (Slades Green and District) A.C., who defeated the Great Western Railway (London), the previous holders, by three goals to nil, after a keenly contested game. Sir Felix Pole was unable to attend the match, but the cup and medals were presented on his behalf by Mr. J. F. Lean, Assistant to General Manager, G.W.R. The "Sir Herbert Walker" Bowl, awarded to the billiards individual champion, has been won by Mr. R. Barber, L.M.S.R., Derby, while the billiards team championship has been gained by the L.M.S.R. Euston Library team. The winners in the ladies' hockey competition were the Railway Clearing House team.

* * *

Motorists travelling to and from the Continent now have the use of a special service of fast cargo steamers at greatly reduced rates between England and France for the conveyance of their motor-cars. These services will be run daily (Sundays included) outwards from Folkestone Harbour at 10.0 a.m. and from Dover at 3.30 p.m. On Mondays, July 15, 22, 29, August 12, 19, 26, September 2, also Tuesday, August 6, the service will leave Folkestone at 9.45 a.m. The return services will leave Boulogne at 4.45 p.m. and Calais 11.0 a.m.

* * *

A clock which simultaneously tells the time all over the world is the latest feature of interest to be seen at the new Piccadilly Circus station. It has been fixed in the subway which encircles the booking hall. Originally the "Underground" had contemplated the installation of a battery of clocks showing the time at principal cities of the Empire and at some foreign capitals; but the new clock combines all this and more in a single instrument. It takes the form of a map of the world, on Mercator's projection, with a narrow band travelling continuously from east to west along the line of the Equator, the hours of the day and night being marked upon the band. Thus at any moment the time at any place can be read at a glance. The clock has been designed by the "Underground" engineers.

* * *

The L.N.E.R. announces that new cheap tickets available for any period from seven to 15 days will be issued from Liverpool Street to Antwerp every Friday and Saturday from May 1 to September 30, and to Zeebrugge every Friday from June 21 to September 6. The fares—third-class rail and second-class steamer—will be £1 15s. to Antwerp and £1 10s. to Zeebrugge. Similar tickets to Flushing will be issued daily, fare £2.

* * *

Three new halts have been provided on the Londonderry and Lough Swilly Railway on the line from Buncrana to Carndonagh: (1) at Kinnego Road, (2) Illies, between Drumfries and Clonmany, (3) Carndoagh, between Rashenny and Carndonagh.

* * *

Two new corridor trains have been put on the Eastbourne-London express business service leaving Eastbourne at 8.10 and

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8.33 a.m., arriving at London Bridge at 9.42 and 10.5 a.m. respectively. The homeward services leave London Bridge station at 4.5 and 5.5 p.m.

* * *

MOORHOUSE STATION, on the Hull and Barnsley section of the London and North Eastern Railway, has been closed for passenger traffic.

* * *

A NEW halt at Springhead is now available for passenger traffic. This halt is on the line between Hull (Paragon) and South Howden.

* * *

THE L.N.E.R. River Orwell boat service between Ipswich and Felixstowe this year commences on Friday, May 17, and terminates on Sunday, September 29.

* * *

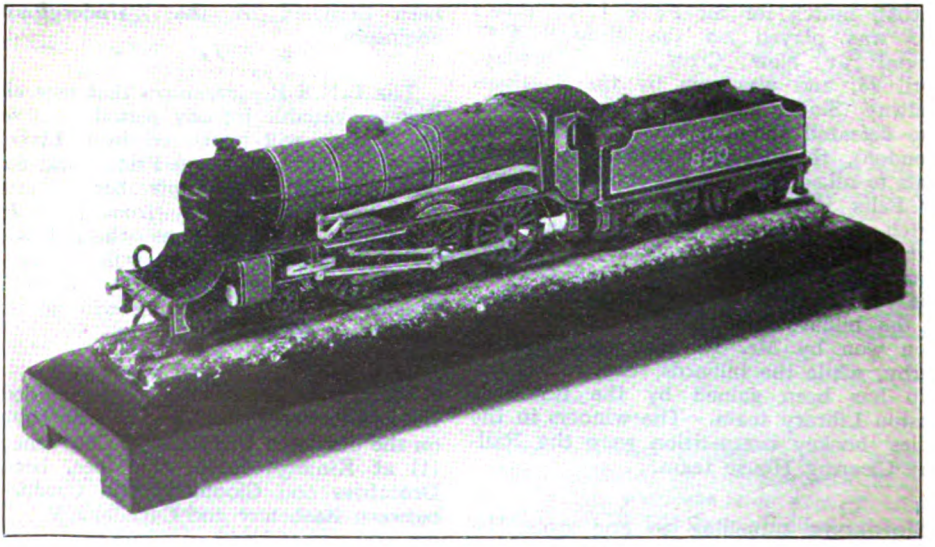
THE new twin-screw steamer "Vienna" for the L.N.E.R. night service between Harwich and the Hook of Holland was launched from John Brown & Co.'s shipyard at Clydebank on April 10. The naming ceremony was performed by Lady Barrie, wife of Sir Charles Barrie, a director of the L.N.E.R. The "Vienna" is the first of three vessels now being built for the L.N.E.R., and will have accommodation for 450 first-class and 104 third-class passengers; it will be not only the most luxurious but the largest steamer sailing between Britain and the Continent. The "Vienna" will be completed in July in time for the summer traffic, and the L.N.E.R. will then have a fleet of 27 vessels operating on their Continental services.

* * *

NINE entirely new trains of the most modern type have been put into service on the Piccadilly Railway. The whole of the original rolling-stock of this line is being replaced and 27 new trains of six cars each are being supplied for this purpose. The old cars, which have been in service since the line opened in December, 1906, are being sold as scrap, and the last will have disappeared by the beginning of July. The new rolling-stock is identical with the new cars already in service on the Hampstead Line. As soon as the Piccadilly Line has its full complement of these new trains, the old rolling-stock on the Bakerloo Line will also be replaced. It is expected that all the new cars for the Bakerloo will be in service by the end of the year or early in 1930.

* * *

A SCHEME for the general enlargement of and the construction of a new restaurant the L.M.S. "Midland" Hotel, Bradford, and ball room, has been approved by the directors of the L.M.S.R. A contract for about £7,000 has been let for a portion of




**SCALE MODEL OF "LORD NELSON" LOCOMOTIVE, S.R.**

*Made by Mr. S. Stott, R.M.S.P. Co.*

Wheels are of wood and the remainder of odd scraps of metal, papier maché, &c.

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this work to Chas. Booth & Son, Lodget Green, Bradford.

* * *

THE work of installing the twin escalators at Camden Town "Underground" station is proceeding rapidly. The 90-ft. escalator tunnel has been bored, and a circulating chamber, 19 ft. 4 in. in diameter, has been excavated at the foot of the tunnel. Four new passageways, each 75 ft. in length, will lead to the platforms. The escalators will be in service about midsummer. Camden Town will be the 29th "Underground" station to be equipped with moving stairways, and will bring the total number of escalators up to 85.

* * *

RECENTLY one of the largest cement kilns constructed by Vickers-Armstrongs Limited, of Barrow-in-Furness, was despatched by the London Midland and Scottish Railway from Barrow-in-Furness to Haverton Hill. This kiln was made in nine sections varying from 26 ft. 4 in. to 34 ft. 10 in. in length, and from 8 ft. 10 in. to 10 ft. 10 in. in diameter, weighing from 10 tons up to 19 tons per section. Owing to the width of the largest pieces, it was necessary to load them 4 in. out of centre towards the six-foot side and to secure the traffic so as not to increase the dimensions. L.M.S. bogie well wagons were used, and arrangements made for working forward by special train when the opposite line was clear of traffic. The photograph on page 492 shows three large sections, together with a recuperator, ready to leave Vickers-Armstrongs works at Barrow.

* * *

MR. G. T. MOODY points out that in the article entitled "The World's Greatest Suburban Electrification," included in the April number, the South London trains were not mentioned among the departures from Victoria. They were, however, included in the London Bridge departures, so that they were not overlooked entirely. These trains leave Victoria at 8, 28 and 48 minutes past the hour at busy periods, at 18 and 48 minutes during the quieter hours, and on Sundays at 22 and 52 minutes.

* * *

REFERRING to Mr. J. Walton's query, mentioned on page 326 of the April number, Mr. G. T. Moody states that the noises in the A.C. motor coaches used on Sutton and Coulsdon North services are caused by the fans used to provide forced ventilation to the motors and transformers. There are six fans in all, one for each motor and one for each of the two transformers.

* * *

REFERRING back to remarks in recent issues in regard to the Toomer loop at Strood, Mr. G. T. Moody writes: "May I point out that the East Kent Railway (predecessor of the L.C. & D.R.) was opened in 1858 from Strood to Faversham. The loop between Strood and Rochester was practically closed after the opening of the L.C. & D.R. main line to London in December, 1860, and the 'Toomer Loop' service revived some 18 years later, after agitation in which a Mr. Toomer, Mayor of Rochester, was prominent. Details will be found in Vol. XIX of THE RAILWAY MAGAZINE."

* * *

IN reply to a question in the House of Commons, the Minister of Transport stated that on January 31, 1928, the total number of private owners' wagons in service on British railways was 638,000, of which about 578,000 were for coal and coke traffic.

* * *

"BARUM" sets another railway query, as follows:—A station (not a halt or platform) within fifty miles of London, on a main route, which is served one way by one passenger train only and in the other by one calling conditionally only. There are no trains calling on Sundays.

* * *

IN reply to Mr. Cruise's query as to the old engine *Lion*, illustrated on page 327 of the April number, Mr. C. W. Reed writes as follows:—"These locomotives were removed from Langton Dock North End pumping station in 1878, when two large single-cylinder horizontal mill-type engines were installed, made by Hick, Hargreaves, of Bolton, with Corliss valve gear and 15-ft. built-up flywheels. These engines are still driving the original chain-pumps, which are used for draining the docks; but are also geared to water turbines for quick pumping."

* * *

FURTHER nicknames mentioned by Mr. S. W. Baker are:—G.W.R. "pannier" tanks, "Matchboxes"; 2-4-0T's and 0-4-2T's, "Tiches"; 2-4-0T's and 0-6-0T's, without cabs, appropriately, "Get-Wets."

* * *

SIR FREDERICK SYKES, Governor-General of Bengal, on March 26, opened the Great Indian Peninsula Railway new main-line terminal station, Bombay. This adjoins the Victoria Terminus, one of the best-known buildings in Bombay, and now reserved for suburban traffic. The building

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of the new station was rendered necessary by the remodelling of the Victoria Terminus, consequent on the quadrupling of the track as far as Kalyan and the adoption of schemes for electrification.

* * *

OWING to the transfer of the offices of the District Manager, District Superintendent, and District Locomotive Running Superintendent to Lincoln, the L.N.E.R. have decided to erect a new telegraph office in order to cope with the increased business which has to be undertaken by telegraph.

* * *

THE L.N.E.R. announces that a competition for prizes for the best-kept stations throughout their system will be held in 1929 on similar lines to last year. An inspection will take place during July and the first fortnight of August, and money prizes and certificates will be awarded. The situation of the station and space available for flower and shrub displays as well as the general condition and cleanliness of the station premises, will be taken into consideration by the judges ; 314 prizes were awarded in last year's competition.

* * *

NEARLY £40,000 is to be expended on a new lighting installation for the Central London Railway. The work is to be put in hand at once, and will be completed next year. Hitherto the lighting supply has been by direct current at 600 volts, but an alternating-current installation of low voltage is to take its place, and will give a better lighting service at lower annual cost. The new system will also bring the lighting into line with that on the other Tube railways, and will provide a current supply suitable for working certain automatic ticket issuing machines, small illuminated signs, and automatic "train describers" on the platforms.

* * *

FOR the first time in its history, the New York Central "Twentieth Century Limited" will be operated on daylight saving time, beginning April 28, when daylight saving goes into effect in several Eastern States. The change will be effected by advancing the train's scheduled departure time one hour on standard time. When the change is effective, the train will leave New York at 1.45 p.m., Eastern standard time (2.45 daylight time) ; Boston 11.30 a.m., Eastern standard time (12.30 daylight time) ; and Chicago 11.40 a.m., Central standard time (12.40 daylight time), arriving at Chicago at 8.45 a.m., Central standard time (9.45 daylight time), and in New York at 8.40 a.m. Eastern standard time (9.40 daylight time).

* * *

THE monthly meeting of the Railway Club was held at 57, Fetter Lane, E.C.4, on Monday, April 8, Mr. Kenneth Brown, the President, being in the chair. The L.N.E.R. lecture describing the York Railway Museum was read. This lecture, which was well illustrated by lantern slides, proved to be of considerable interest. The Museum is comprehensive, embracing as it does all branches of railway interest. There are already a number of valuable relics of the past. Hearing about this museum, and seeing the different exhibits illustrated by slides, made one regret once more that a National Railway Museum had not been created years ago. Had this been done, many relics of this past, now irretrievably lost, would have been saved.

* * *

IN consequence of the resignation of Mr. A. F. Bound, Signal Engineer for the Southern Area of the London & North Eastern Railway, we are officially informed that the directors of the L.N.E.R. have approved of the following appointments:—Mr. F. Downes, Telegraph Superintendent, Southern Area, to be Signal and Telegraph Engineer, Southern Area; Mr. C. Carslake, Assistant Signal Engineer, Southern Area, to be Assistant Signal and Telegraph Engineer, Southern Area.

* * *

THE ninth Institute of Transport Annual Dinner was held at the Savoy Hotel, London, on Thursday, March 14, the President, Air Vice-Marshal Sir Sefton Brancker, K.C.B., A.F.C., occuping the chair. The Honorary President, H.R.H. the Prince of Wales, K.G., K.T., honoured the Institute by attending, and there was a very large and distinguished gathering, the total number present being 474.

* * *

ON Thursday, May 9, members of the Sheffield Society of Model Engineers and Model Railway Club visited the Crewe works of the L.M.S.R., by kind permission of Sir Henry Fowler, K.B.E. Full particulars of the club may be obtained from J. H. Woolley, 173, Watt Lane, Sheffield.

* * *

MR. C. B. CHAPMAN mentions that certain alterations have been made in the head codes for Southern Railway electric trains, the indications now being: H—London Bridge to Victoria, *via* Tulse Hill and Streatham Hill; and T—London Bridge to Victoria, *via* the South London line. The return routes in each case are differentiated by a dot over the letter.

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## L.M.S.R.

L.N.W. 4-6-0 No. 5953 *Buckingham* recently worked to Glasgow (Central) via G.S.W. route, on a football special from Crewe. C.R. 0-8-0's Nos. 17993-4-6-7 and 0-6-0ST's Nos. 16102, 16150, 16215, 16220-5-7-9 are, it is understood, condemned.—[J. F. McEwan.]

Wirral 2-4-2T No. 6762 and 0-4-4T No. 6776 are still on the Wirral section.—[" Cestrian."]

0-6-0 No. 3276, with cab on tender, has been working between Cromford and Whatstandwell.—[D. L. Williams.]

L.N.W. 2-4-0's seen at Carlisle include Nos. 5027 *Franklin*, 5032 *The Queen*, 5034 *Glow Worm*, 5053 *Humphrey Davy*, 5054 *Antelope*, 5068 *Miranda*, and 5069 *Penrith Beacon*.—[J. D. Blair.]

New " G3 " class 0-8-0 superheater freight engines ex Crewe are in traffic up to No. 9512. The two remaining 0-6-0 standard shunting tanks ex Beardmore & Co. are now at work, Nos. 16748-9. Class " D " 0-8-0's Nos. 9042 and 9053 (old Nos. 1857 and 1825) have been converted to " G1 " class (superheater). 0-6-2 coal side tanks Nos. 7604, 7605, 7606 and 7823 are now equipped for motor train working. As thus altered, these engines are fitted with vacuum control gear instead of the usual rodding arrangement. Midland division vacuum controlled 0-4-4T No. 1253 is now stationed at Rhyl, having previously worked for a short time on the Caledonian section. N.S. " G " class 4-4-0 No. 5410 and 6-ft. S.L. class 2-4-0 No. 5097 *Adelaide* have been withdrawn from service. In reply to " Redgauntlet " (May issue, page 421), I append a list of the 2-4-0 " Jumbos " that are still in service:—Nos. 5000-3, 5005, 5011, 5012, 5014, 5018, 5020-1, 5023, 5027, 5029, 5031-2, 5034, 5041-2, 5045, 5048, 5050, 5053-4, 5062, 5064, 5068-70, 5075, 5084, 5087, 5092, 5095, 5102 and 5104 (total 36).—[C. Williams.]

## L.N.E.R.

New engines noted include No. 2725 (0-6-0), 2754 *Rutlandshire*, No. 2755 *Berkshire*, and Nos. 2679 and 2680 (0-6-0T's). G.N. 4-4-2 No. 4419 recently worked between Newcastle and York. N.B.: 0-6-0 No. 9046 was noted on a goods train at Darlington.—[W. L. Clayden.]

Rail car No. 34 *Tweedside* has been working in the Edinburgh district. No. 9881 *Borderer* now has its name on rear splashers. In some cases " Pacifics " work right through from Newcastle to Dundee.—[C. M. Furst.]

0-6-2T's Nos. 2689 and 2690 are at Eastfield, Glasgow. Rail car No. 35 *Nettle* is at Carlisle. N.E. 4-8-0T's are class " T1," Nos. 1350-1359 and 1656-1660. 4-6-2T's are " A6 " and " A7," Nos. 686-695, and 1113, 1114, 1126, 1129, 1136, 1170, 1174-1176, 1179-1183, 1185, 1190-1193, 1195. 4-4-4T's (Class " H1 ") are Nos. 1326-1330, 1499-1503, 1517-1531, and 2143-2162.—[J. D. Blair.]

## G.W.R.

0-4-2T has been rebuilt with a domeless boiler, and generally works on the Wallingford branch.—[G. F. Raynor.]

0-6-0ST No. 2195 *Cwm Mawr* was noted recently shunting at Swindon.—[F. J. T.]

The following new engines have been turned out of the Swindon Works since March 12:—Passenger 4-6-0 No. 4920 *Dumbleton Hall* (Hall Class). Goods 0-6-0T No. 5750. The following new engines have been received from the North British Locomotive Co., Ltd., Glasgow:—Goods 0-6-0T Nos. 5718-24, 5736, and 5738-43.—[G.W.R. Magazine.]

## S.R.

Besides B607, No. B453, 0-6-2T, is still in the Marsh black livery.—[O. J. Morris and " Chiro."]

2-6-0 No. E804 was recently noted on a Continental express at Newhaven, a service generally worked by 4-4-2's.—[" Sir Constantine."]

Adams 0-4-4T No. E1 works from Eastleigh. Nos. E0128, 0149, 0150, 0316, 0328, 0331, 0335, 0410, 0411 and 0413



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(0-6-0ST's) are still in service.—[" 783 SIR GILLEMERE."]

### S. & D. J.R.

New 0-6-0T's are painted blue and are class 3P3G.—[" 783 SIR GILLEMERE."]

### Metropolitan District Railway.

Steam engine No. 35 is not an original M.D. locomotive, as in the case of No. 34. It is an ex-Metropolitan engine.—[A. CRAWSHAW.]

### Great Southern Railway (Ireland).

During a visit to Broadstone Works the only non-M.G.W. section engines noted were 0-4-4T No. 81 in erecting shop, and the former Timoleague and Courtmacsherry 2-6-0T *Argadeen;* the boiler has just been scrapped. 0-6-0 No. 632 and 2-4-0 No. 663 were just out repainted. I was informed that the engine involved in the smash in Sligo station in December, 1926, was 4-4-0 No. 25 *Ballynahinch* (now 538). 4-4-0 No. 334 met with a mishap near Wexford during February, on the down morning mail. No. 453 is now engaged. Nos. 333 and 336 (4-4-0) work the other two main-line trains daily. No. 143 (0-6-0) works from Canal Street. Does any reader know where 0-6-0T's Nos. 299-300 work on the G.S.R.?—[C. J. COGHLAN.]

No. 329 is being rebuilt with new superheated boiler, in place of the present " taper " design. 4-6-0 No. 501 has been fitted with " top feed," similar to that used on the Woolwich Moguls. 4-8-0T No. 900 and 4-4-0 No. 341, *Sir William Goulding,* are being overhauled. Locomotives noticed working cattle and horse specials to Lansdowne Road sidings, for the spring show there, were 0-6-0's Nos. 609, 242, 243, 442 and 445 on May 6, and 0-6-0's Nos. 163, 567 and 171 on May 7, also Nos. 259 and 443, 0-6-0's, on May 6 and 7 respectively.—[R. A. JACKSON.]

Numerous other letters have also been received giving interesting details of engines seen and other observations, while letters from which extracts are made above have similarly been read with appreciation.

Acknowledgment and thanks are also made to the following correspondents: " Evenlode," J. Colyer-Ferguson, J. G. Forsyth, " 2800 Sandringham," L. B. Hewitt, G. Whitehouse, R. A. Jackson, " Consolidation," A. Crawshaw, R. F. Kemball, D. M. Miles, " Eureka," " Chiro," A. J. Jackson, C. B. Chapman, BM/OVN6, " Cumbrian," " Centurion," R. A. Read, J. M. Craig, " S.E.C.R.," C. R. Prescott, H. N. James, " King Edward VII," " 0458 Ironside " and " 734 Clausentum," D. R. Beckett, G. H. Young, R. Peckitt, A. W. G. Watson, F. W. Johnson, and " Norwegian Monarch."

## AN OLD FRENCH SHUNTING ENGINE.

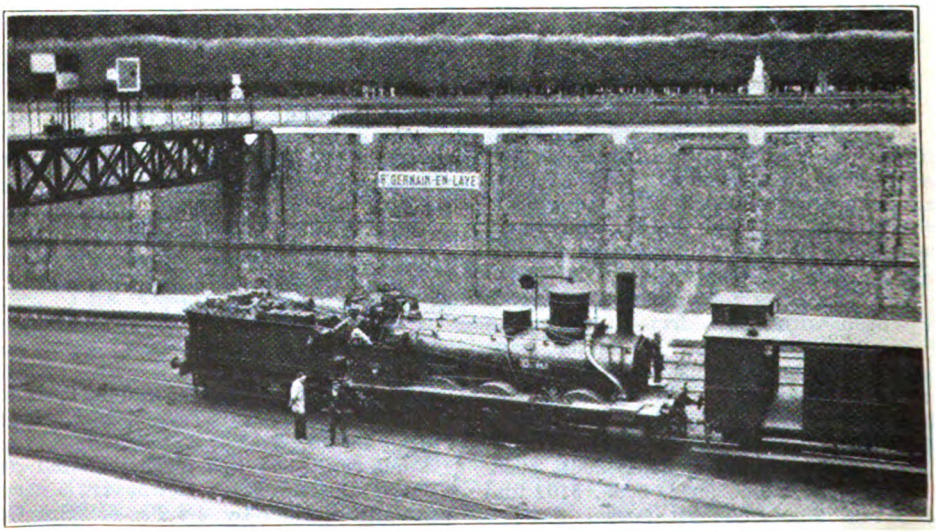


*Photo.*] [*C. B. Farrar.*

**0-6-0 LOCOMOTIVE USED FOR BANKING TRAINS ON LE PECQ-ST. GERMAIN INCLINE.**

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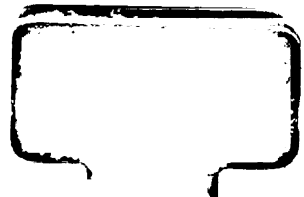

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